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GEOLOGICAL SCIENCES
VOLUME II PART 1

The Marine Shells of the West Coast of North America

VOL. II

PART I

BY

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PREFACE

As already stated in the Introduction to Volume I, the purpose of this work is to bring together the marine shells of the west coast of North America from the Arctic Ocean to San Diego, giving the original description, whereabouts of the type and type locality, geographical and geological range. The writer has been engaged continuously for eight years in the preparation of this work, in the museum at Stanford University and in the field from Puget Sound to San Diego; and has made four journeys to compare material in the eastern museums: the United States National Museum, Philadelphia Academy of Natural Sciences, and the American Museum of Natural History, New York. To the authorities of these institutions the writer wishes to express her thanks for generous assistance.

In this work are figured all common species of marine mollusca of the Californian province, a great many being figured for the first time. When figures are not given, full references are made where figures may be seen in papers easily accessible. It is the purpose of the writer to make this work useful to the amateur as well as to professional conchologist.

The writer wishes anew to state her many obligations to the following for assistance afforded her in preparation of the work: W. H. Dall, Paul Bartsch, United States National Museum; H. A. Pilsbry, Philadelphia Academy of Natural Sciences; J. P. Smith, T. S. Oldroyd, Stanford University; Roy W. Miner, American Museum of Natural History, New York City; B. L. Clark, University of California; Agusta Arnback Christe-Linde, Riksmuseum, Stockholm, Sweden; G. C. Robson, Lieutenant-Colonel A. J. Peile, British Museum; J. R. LeB. Tomlin, St. Leonards-on-Sea, England; R. Spavck, Zoölogy Museum, Copenhagen, Denmark; Paul Loyning, Zoölogy Museum, Osla, Norway; T. C. Frye, University of Washington, Seattle; Paul Dautzenberg, Paris; Nellie Tegland, University of California; Stanford University; Geological Survey of Canada; San Diego Society of Natural History; United States National Museum; Stanford Alumni.

The necessary division of Volume II into three parts has resulted in somewhat defective co-ordination of plates and text, but the references have been adjusted accordingly. The entire volume, Parts 1–3, has to do with the marine gasteropods of the west coast of North America.

March 1, 1927

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RANGE OF SPECIES

CIRCUMBOREAL SPECIES

Admete couthouyi
Buccinum ciliatum
Buccinum glaciale
Buccinum plectrum
Buccinum tenue
Columbella rosacea
Colus conulus
Cylichnella alba
Cylichnella nucleola
Cylichnella occulta
Diaphana globosa
Lora bicarinata
Lora elegans
Lora harpa
Lora harpularia
Lora incisula
Lora impressa
Lora pleurotomaria
Lora rosea
Lora scalaris
Lora, v. spitsbergensis
Lora tenuicostata
Lora trevelliana
Lora turricula
Lora violacea
Lora woodiana
Philine sinuata
Plicifusus arcticus
Plicifusus kroyeri
Plicifusus verkruzeni
Pyrulofusus deformis
Retusa obtusa
Retusa pertenuis
Retusa semen

RANGE TO GULF OF CALIFORNIA

Acteocina carinata
Acteocina infrequens
Admete microsoma
Anachis penicillata
Bullaria gouldiana
Bulla quoyi
Cadulus fusiformis
Columbella, v. californiana
Columbella carinata
Columbella tuberosa
Crassispira montereyensis
Cryptogemma polycaste
Cylichnella diegensis
Cypraeolina pyriformis
Dentalium fisheri
Dentalium semipolitum
Fusinus luteopictus
Fusinus taylorianus
Gadinia reticulata
Haminoea vesicula
Mangilia cetolaca
Mangilia roperi
Marginella politulus
Melampus olivaceus
Microglyphus estuarinus
Mitromorpha filosa
Pedipes unisulcatus
Pedipes liratus
Pleurobranchus digueti
Terebra, v. philippiana
Williamia peltoides

RANGE TO LOWER CALIFORNIA

Acteon punctocoelata
Aesopus myrmecoön
Alectrion californianus
Alectrion cerritensis
Alectrion, v. eupleura
Alectrion fossatus
Alectrion insculptus
Alectrion mendicus
Alectrion noduliferus
Alectrion perpinguis
Amphissa undata
Amphissa versicolor
Atys casta
Buccinum strigillatum
Conus californicus
Columbella aurantiaca
Columbella callimorpha
Columbella hypodra
Clathrodrillia fancherae
Clathrodrillia, v. ophioderma
Cryptoconus tremperianus
Cryptoconus tryonianus
Cylichnella diegensis
Cytharella densilineata
Cytharella fusconotata
Cytharella janira
Dentalium watsoni
Exilia rectirostris
Fusinus robustus
Glyphostoma adria
Haminoea olgae
Kellettia kellettii
Macron kellettii
Macron lividus
Marginella jewettii
Microglyphis breviculus
Olivella biplicata
Olivella porteri
Pseudomelatoma moesta
Pseudomelatoma torosa
Volvulella cooperi
Volvulella cylindrica

RANGE TO CENTRAL AMERICA AND PANAMA

Aesopus eurytoides
Acteon traski
Acteocina smirna
Cadulus perpusillus
Cancellaria io
Cryptogemma herilda
Cystiscus minor
Cytharella branneri
Cytharella merita
Dentalium agassizii
Dentalium inversum
Dentalium neohexagonum
Dentalium rectius
Haminoea virescens
Lora grippii
Mangilia lineolata
Marginella californica
Mitra solitaria

RANGE TO ECUADOR, PERU, GALAPAGOS ISLANDS

Alectrion nodicinctus
Borsonella diegensis
Cadulus californicus
Dentalium dalli
Dentalium numerosum
Engina carbonaria
Mangilia barbarensis
Philbertia affinis
Philbertia rava

RANGE TO JAPAN

Beringius indentatus
Buccinum chartium
Buccinum chishimanum
Buccinum simulatum
Colus spitsbergensis
Corolla spectabilis
Kellettia kellettii
Liomesus nux
Liomesus ooides
Plicifusus virens
Volutharpa perryi

LIST OF THE FAMILIES IN PART I

Volume II, Part I, contains the following families:

Dentaliidae
Spiratellidae
Cavoliniidae
Cymbullidae
Clionidae
Pneumodermatidae
Desmopteridae
Acteonidae
Acteocinidae
Scaphandridae
Diaphanidae
Bullariidae
Akeridae
Philinidae
Gastropteridae
Aglajidae
Aplysiidae
Tylodinidae
Pleurobranchidae
Ellobiidae
Gadiniidae
Siphonariidae
Onchidiidae
Terebridae
Conidae
Turritidae
Cancellariidae
Olividae
Marginellidae
Volutidae
Mitridae
Fasciolariidae
Chrysodomidae
Buccinidae
Colubrariidae
Alectrionidae
Columbellidae

CLASS SCAPHOPODA

Family DENTALIIDAE

Genus **DENTALIUM** Linnaeus, 1758

Shell tubular, symmetrical, curved, open at each end, attenuated posteriorly; surface smooth or longitudinally striated; aperture circular, not constricted. The tooth-shells are animal-feeders, devouring foraminifera and minute bivalves; they are found in sand, or mud, in which they usually bury themselves.

TYPE. *Dentalium elephantinum* Linnaeus.

DISTRIBUTION. West Indies, Norway, Britain, Mediterranean, India, east and west coast of America. Fossil: Devonian . . . . Europe, Chile, North America.

Dentalium inversum Deshayes, 1825

Société d'histoire Naturelle, Paris, Memoires, **2:** 370; Pl. 16, figs. 21, 22.

D. testa tereti, subarcuata, subulata, angulata, hylina, postice tenuissime striata, rubescente, antice lavigata, albida; fissura angustissima, profunda, ventrali. (Deshayes.)

Shell thin, slender, smooth, moderately arched, gradually increased, red near the apex, white toward the margin of the aperture; apex attenuated, acuminated, incised with a rather long fissure on the ventral side.

This species is singular, possessing a slit on the ventral or inner side of the curve. (*Conchologia Iconica.*)

Length, 30; diameter of aperture, 1.9; of apex, 0.6; length of slit, 1.8 mm.—of a specimen in the Philadelphia Academy. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE in Museum Paris? Type locality unknown.

RANGE. Bering Sea to Panama in increasingly deep water.

Dentalium neohexagonum Sharp and Pilsbry, 1897

Tryon and Pilsbry, *Manual of Conchology,* **17:** 19; Pl. 11, figs. 74–86.

Shell decidedly curved toward the apex in the young, only moderately arcuate when adult; slender (the length 12–14 times the greatest diameter, in adults); much attenuated toward the apex; white. Sculpture of six strong, rounded, projecting ribs, which on the larger half or third of the

adult shell becomes reduced to mere rounded angles; interstitial riblets wanting, or with one or two low cords developed in each interval toward the larger end of the shell only; usually with coarse wrinkles of growth on the larger half of the length. Aperture hexagonal, but with the angles so rounded as to appear almost circular; oblique; anal orifice rounded-oval, without notch or slit. Length, 30.5; diameter of aperture, 2.5 mm. (Sharp and Pilsbry.)

TYPE in Philadelphia Academy of Sciences. Type locality, Santa Barbara, California.

RANGE. Monterey, California, to Guacomayo, Central America.

This species has been called *D. hexagonum* Gould by California collectors.

Dentalium semipolitum Broderip and Sowerby, 1829

Zoölogical Journal, 4:369. Tryon and Pilsbry, *Manual of Conchology*, 17: Pl. 16, fig. 54.

Shell slender, moderately or decidedly curved, attenuated toward the apex; rather thin, milk-white and very glossy. Sculpture: deeply engraved with very numerous, fine, close, subequal, longitudinal striae, extending from the apex downward one-third to two-thirds the shell's length (and of course covering the entire length of young shells); the remaining one- or two-thirds smooth and polished, brilliant, scarcely showing growth-lines. Aperture circular, the peristome thin; anal orifice minute and round, no notch or slit. Length, 26; diameter, of aperture, 2.6 mm. (Tryon and Pilsbry, *Manual of Conchology*.)

TYPE in British Museum. Type locality, not specified.

RANGE. San Pedro, California, to La Paz, Lower California.

Dentalium dalli Pilsbry and Sharp, 1897

Plate 1, fig. 5

Tryon and Pilsbry, *Manual of Conchology*, 17; Pl. 21, fig. 46.

Shell regularly but only slightly curved, evenly tapering, thin and fragile; opaque, slightly bluish-white. Surface brilliant, glossy, and polished; but, in all specimens seen, mainly dead or lusterless whitish from loss of the greater part of the superficial gloss, which remains near the aperture only, or sometimes in patches or irregular rings elsewhere. Growth-striae faint; no other sculpture. Aperture circular, thin-edged orifice; no slit or notch. Length, 45; diameter of aperture, 4; at apex, 1.5 mm. (type). (Pilsbry and Sharp.)

TYPE in United States National Museum, No. 107696. Type locality, Bering Sea.

RANGE. Bering Sea, north of Unalaska, 351 fathoms; off Tillamook Bay, Oregon, 786 fathoms; off Point Conception, California, 278 fathoms; to off Acapulco, Mexico, 661 fathoms; to Point Aguja, Peru.

Dentalium agassizii Pilsbry and Sharp, 1897

Plate 1, fig. 1

Tryon and Pilsbry, *Manual of Conchology*, **17**: 26; Pl. 12, figs. 90–94.

Shell gently curved posteriorly, the latter half nearly straight, tapering, solid, white and lusterless (often with a black incrustation toward the apex, and reddish-brown on the larger end). Sculpture: at the apex there are 12–20 rather sharp and well-raised riblets separated by wider, concave intervals; at a varying distance from the apex an interstitial thread appears in these intervals, so that near the middle of the shell's length there are double that number of riblets and threads, alternately larger and smaller, and at the aperture there are 25–48 unequal riblets and threads, lower and blunter in large examples. Aperture somewhat oblique, subcircular, but the arc along the concave side is sometimes less curved than the remainder of the peristome, and the edge is irregular from breakage. Anal orifice small, circular, no slit or notch; but often the inner layer projects tube-like from erosion of the softer, more chalky, outer layer. Length, 65; diameter at aperture, 4.3; at apex, 0.7 mm. (type). (Pilsbry and Sharp.)

TYPE in United States National Museum. Type locality, Gulf of Panama.

RANGE. Santa Barbara Islands, California, to Panama.

Dentalium rectius Carpenter, 1864

Plate 1, fig. 3

Supplementary Report, British Association for the Advancement of Science, 1863, p. 648. *Proceedings*, Philadelphia Academy of Natural Sciences, 1865, p. 59. Tryon and Pilsbry, *Manual of Conchology*, **17**; Pl. 21, fig. 45.

D. t. valde elongata, valde tereti, lentissime augente, vix arcuata; laevi, tenuiore, albida, subdiaphana, valde nitente; aperturam versus tenuissima. (Carpenter.)

Shell almost straight, slender and long, attenuated toward the apex, thin and fragile, bluish-white, somewhat translucent, with some opaque white flecks or rings, often encrusted near the aperture with a reddish deposit. Surface very glossy, polished, growth-marks being only faintly seen, and sculpture absent. Aperture not oblique, almost circular, but the tube is a little compressed laterally; peristome thin. Apical orifice small, circular, without notch or slit, but from its extreme fragility the end is

often nicked or broken. Length, 40; diameter at aperture, 2.6; at apex, 1 mm. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE not known to writer. Type locality, Puget Sound.

RANGE. Stephens Passage to Panama Bay.

Dentalium (oerstedtii Mörch) **numerosum** Dall, 1897

Tryon and Pilsbry, *Manual of Conchology,* **17**:25; Pl. 10, figs. 70–73.

The general proportions and curvature are as in typical *D. oerstedtii,* but the sculpture is less coarse; tertiary riblets soon appear on the concave as well as the other sides of tube, and toward the middle a varying number of threads of a fourth order are interposed; toward the aperture all sculpture becomes flattened, and the total number of riblets and threads is decidedly greater than in typical *oerstedtii.* The specimens are glossy. Length, 41.5; diameter of aperture, 3.5; of apex. 0.6 mm. (Dall.)

TYPE in United States National Museum, No. 87559. Type locality, Coronado Islands.

RANGE. Coronado Islands south to Panama and the Galapagos Islands.

Dentalium watsoni Sharp and Pilsbry, 1897

Tryon and Pilsbry, *Manual of Conchology,* **17**:113; Pl. 21, fig. 44.

Shell slightly curved, long, extremely slender, not much tapering, thin, white; surface shining, wholly free from longitudinal sculpture, the growth-lines fine and inconspicuous. Aperture circular, hardly oblique. Anal orifice small and circular, simple; no slit or notch. Length, 31; diameter at aperture, 1.6; at apex, 0.75 mm. (Pilsbry and Sharp.)

As straight as *D. rectius* Carpenter, but very much more slender. It is more curved than the closely allied *D. aequatorium* from off Ecuador, and slightly larger at the aperture. (Pilsbry.)

TYPES in United States National Museum, Nos. 107702 and 107706. Type locality, off Tillamook Bay, Oregon, in 786 fathoms.

RANGE. Tillamook Bay, Oregon, to San Diego, California.

Dentalium fisheri (Stearns) Pilsbry, 1897

Tryon and Pilsbry, *Manual of Conchology,* **17**:36; Pl. 6, figs. 61–65.

Shell cylindrical, becoming square toward the apex, not much tapering, and nearly as wide at the apex as at the aperture; moderately arcuate; comparatively solid and strong. White with riblets, gray, lusterless. Sculpture of four strong angles at and near the apex, where it is square; these angles rapidly decreasing in prominence until at the first third of the shell's length the section is almost round. Very near the apex each of the four

faces is parted by a median riblet; and a little farther on a tertiary series of riblets, one on each of the intervals except the two bounding the keel of the convex side, in which intervals small riblets develop later. At the middle of the shell's length the section is circular and the 28–30 riblets nearly equal in size; a few threads are intercalated toward the aperture, where the riblets are slightly unequal, low, narrow and close. Aperture circular, slightly oblique. Anal orifice circular, with a slightly raised rim; placed in the middle of the square apex. Length, 14.1; diameter at aperture, 1.8; at apex, 1.2 mm. (Pilsbry.)

Provisional name only; no description. (Pilsbry.)

TYPE in United States National Museum, No. 46204. Type locality, Los Animas Bay, Lower California.

RANGE. Los Animas Bay, Gulf of California.

Dentalium vallicolens Raymond, 1904

Plate 1, fig. 2

Nautilus, **17**:123.

Adult shell large, rather slender, moderately curved posteriorly, the latter half nearly straight; cream-white, often yellowish toward the mouth, shining where not eroded, earlier portion usually dull and chalky because of erosion; growth-lines fine, irregular, distinct, rarely an encircling groove due to repaired fracture; at the apex there are longitudinal, low, rounded, inconspicuous threads, of which seven or eight are more prominent and three to six in each interspace are less prominent; these die out, and fine, superficial striae appear, visible under the glass, and continued to the mouth of the shell, seven or eight per millimeter of circumference; aperture simple, circular, mouth slightly oblique. Length, 64.5; diameter of aperture, 5.3; of apex, 1.5; at middle, 4.6; height of arch from chord, 2.5 mm. (Raymond.)

TYPE in University of California Collection. Type locality, Station 12, submerged valley off Redondo, Santa Monica Bay, in 145 fathoms.

RANGE. Straits of Juan de Fuca to Gulf of California.

Dentalium pretiosum Sowerby, 1860

Plate 1, fig. 10

Sowerby, *Thesaurus Conchyliorum,* **95**; Pl. 225, fig. 57.

Testa *D. entali* simillima, sed angustiore, versus apicem haud tantum arcuata.

Less curved and tapering near the apex than *D. entali,* and altogether more cylindrical. (Sowerby.)

This was Nuttall's MS name.

Shell white, solid, smooth, slightly arched, gradually increased, red near the apex, rather narrow, apical fissure small. (*Conchologia Iconica.*)

TYPE in British Museum. Type locality, California.

RANGE. Forrester Island, Alaska, to San Diego, California.

Genus **SIPHODENTALIUM** M. Sars, 1859

Shell an arcuate, slightly tapering tube, largest at the aperture, circular or nearly so in section, and smooth externally. Apex rather large, typically slit into lobes, but sometimes simple. Foot capable of expanding into a terminal disk. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE. *Siphodentalium lobatum* Sowerby.

DISTRIBUTION. Arctic Ocean, Portugal, Gulf of St. Lawrence, Maine, West Indies, Finmark, Torres Strait, N.E. Australia, Korea, Canaries.

Siphodentalium quadrifissatum Pilsbry, 1898

Plate 1, fig. 7

Tryon and Pilsbry, *Manual of Conchology,* **17**:150; Pl. 29, figs. 10–13.

Shell arcuate, the bend greater posteriorly, slender, but slightly tapering, not swollen, subtransparent bluish, with a milky band near the larger end; smooth and rather glossy, the growth lines hardly visible; posterior third slowly tapering, the tube then nearly cylindrical almost to the aperture; quite near the latter it is contracted, the contraction greatest on the convex side. Greatest diameter contained about 7 times in the length of the shell. Aperture oblique, transversely oval; apex cut into four conic teeth by the same number of slits; the tooth on convex side slightly longest, the other three subequal in length, that on concave side wider and obtuse; edges of the teeth somewhat bevelled distally. Length, 8.6; diameter at aperture, 0.85 x 1.0; at largest, 1.12 x 1.22; at apex, 0.65 x 0.7 mm. (Pilsbry.)

TYPE in Philadelphia Academy of Sciences. Type locality, San Diego, California.

RANGE. San Pedro to San Diego, California.

Siphodentalium 4-fissatum Carpenter, MSS label in Smithsonian Institution, from San Pedro.

Genus **CADULUS** Philippi, 1844

Shell somewhat cask-shaped, short and obese, conspicuously swollen in the middle, tapering rapidly toward both ends: convex on all sides, though

less dorsally. Aperture with simple, thin periostome; anal orifice comparatively large, with simple edge, contracted by a wide circular callus or ledge just within the opening. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE. *Dentalium ovulum* Philippi.

DISTRIBUTION. Mediterranean, North Atlantic, North Pacific, California.

Cadulus fusiformis Pilsbry and Sharp, 1898

Plate 1, fig. 4

Tryon and Pilsbry, *Manual of Conchology,* **17**:193; Pl. 35, fig. 14.

Shell but little curved, long and slender, the greatest diameter contained about 9 times in the length of the shell; swelling hardly perceptible, the tube very gradually enlarging from the small apex to the beginning of the last third of the length; thence an equal size is maintained almost to the aperture, just before which it is gently but quite perceptibly contracted on all sides. Surface smooth and glossy, bluish-white, scarcely translucent, with oblique rings of more opaque white, and near the apex some longitudinal white lines; a pellucid ring bordering the lip-edge, behind which there is a short, opaque, white tract, passing gradually into the bluish and banded general color. Tube a mere trifle compressed vertically at the widest part. Aperture oblique, and (measured obliquely) a trifle longer than wide (in the ratio of 35:33); lip thin, sharp. Anal orifice circular and simple. Length, 10.37; antero-posterior diameter at aperture, 1; at widest, 1.14; at apex, 0.37; greatest transverse diameter, 1.17 mm. (Pilsbry and Sharp.)

TYPE in United States National Museum, No. 133809. Type locality, San Pedro, California.

RANGE. Monterey, California, to Cape San Lucas, Lower California. Fossil: Pliocene, San Diego well.

Cadulus hepburni Dall, 1897

Plate 1, fig. 13

Bulletin, Natural History Society of British Columbia, No. 2:12; Pl. 1, fig. 13.

Shell small, polished, smooth, white, nearly straight; apertures circular, their margins simple. Length of shell, 11; diameter at anterior end, 1.25; at posterior end, 0.75 mm. (Dall.)

TYPE in Ottawa. Type locality, near Victoria, Vancouver Island, in 60 fathoms.

RANGE. Victoria, British Columbia, to Monterey, California.

Cadulus tolmei Dall, 1897

Plate 1, fig. 9

Bulletin, Natural History Society of British Columbia, No. 2:13; Pl. 1, fig. 8.

Shell small, thin, polished, translucent bluish-white, rather arcuate and rapidly tapering behind, the anterior orifice oblique, nearly circular, the posterior orifice circular, simple; sculpture none or only of obscure incremental lines. Length of shell, 12; maximum diameter, 2; minimum diameter, 0.7 mm. (Dall.)

TYPE in Ottawa. Type locality, near Victoria, British Columbia, in 60 fathoms.

RANGE. Vancouver Island, British Columbia, to San Quentin Bay, Lower California.

Cadulus californicus Pilsbry and Sharp, 1898

Plate 1, fig. 8

Tryon and Pilsbry, *Manual of Conchology,* 17:180; Pl. 34, figs. 5, 6, 7, 8.

Shell large and solid, well-curved; smooth and glossy, growth-lines being very faintly indicated; opaque white, the posterior half bluish, subtranslucent, with a similarly colored rim at the mouth, or sometimes slightly bluish throughout. Stout, decidedly swollen anteriorly, the greatest diameter contained 4⅕ to 4⅔ times in the length of shell; the equator about at the anterior fourth, either oblique, well-marked and slightly subangular, or less distinct and gently rounded, tapering rapidly toward both ends; outline of concave side noticeably convex in the region of greatest swelling. Section of tube a trifle flattened between the convex and concave sides at the equator or throughout. Aperture subcircular, somewhat oblique. Anal orifice rather large, slightly oval, with no noticeable callus within; its edge irregular from breakage, but possibly two lateral nicks may be normally present. Length, 14.3; antero-posterior diameter at aperture, 2.25; at largest, 3.33; at apex, 1.0; lateral diameter at aperture, 2.3; at largest, 3.4; at apex, 1.1 mm. (Pilsbry and Sharp.)

TYPE in United States National Museum, No. 107698. Type locality ?

RANGE. Clarence Strait, Alaska, to Manta, Ecuador.

Cadulus stearnsii Pilsbry and Sharp, 1898

Plate 1, fig. 6

Tryon and Pilsbry, *Manual of Conchology,* 17:253; Pl. 27, figs. 88, 89.

Shell short, decidedly curved, the bend mainly in the posterior half, very rapidly enlarging, tapering regularly from the largest aperture to

the apex; thin, bluish-white, a little translucent, more or less flecked with opaque white (by incipient surface decay), or with eroded spots. Glossy, with close, fine, distinct growth-striae, very obliquely passing around the tube, bending backward on the convex, forward on the concave side; in most specimens also showing faint, low traces of longitudinal cords on the convex side. Aperture somewhat wider than long, quite oblique, the peristome thin. Anal orifice circular, simple when perfect, but often with irregular, broken edge. Length, 8.6; diameter at aperture antero-posteriorly, 1.75; laterally, 1.9; diameter at apex, 0.7 mm. (Pilsbry and Sharp.)

TYPE in United States National Museum, No. 107700. Type locality, off Tillamook Harbor, Oregon, in 786 fathoms.

RANGE. British Columbia to San Quentin Bay, Lower California.

This is a new name for *C. simplex* Pilsbry and Sharp, 1897, not *D. simplex* Michelotti, 1861. It was described as *Dentalium stearnsii,* Pilsbry and Sharp.

Cadulus aberrans Whiteaves, 1887

Transactions of the Royal Society of Canada, **4**: sec. 4, p. 124, fig. 2.

Shell slender, moderately but distinctly curved, large and much elongated for the genus, increasing very slowly but regularly in diameter, not distinctly (if at all) swollen in advance of the middle, and very slightly and scarcely perceptibly constricted immediately behind the aperture. Testa extremely thin, surface polished, very glossy and shining, smooth to the naked eye, but under a lens it is seen to be marked with minute and transverse but somewhat oblique lines of growth. Length, 13.5; breadth, 1.3 mm. (Whiteaves.)

TYPE in Ottawa. Type locality, Quatsino Sound, British Columbia.

RANGE. Known only from type locality.

Cadulus perpusillus Sowerby, 1832

Proceedings, Zoölogical Society of London, 29.

Dent. testa minima, tenui, angusta, curva, polita, alba; apice acuto; apertura coarctata, obliqua. Long., $\frac{3}{10}$; lat., $\frac{1}{10}$ poll. (Sowerby.)

Shell small, thin, narrow, curved, polished, and white. Apex acute; aperture contracted, oblique. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE in British Museum. Type locality, Puerto Salango, west coast of Colombia.

RANGE. Monterey, California, to Panama.

CLASS GASTROPODA

Family SPIRATELLIDAE

Genus **SPIRATELLA** Blainville, 1817

Coquille papyracée, très-fragile, planorbique, subcarénée, enroulée un peu obliquement, de manière à être profondément et largement ombiliquée d'un côté; spire un peu saillante, et pointue de l'autre; ouverture grande, entière, non modifiée, élargie à droite et à gauche; le péristome trenchant. (Blainville.)

Shell subglobose, sinistrally spiral, umbilicated; whorls transversely striated; umbilicus margined. (Tryon, *Structural and Systematic Conchology.*)

TYPE. *Spiratella antarctica* Forbes.

DISTRIBUTION. Arctic and Antarctic seas, gregarious.

Spiratella pacifica Dall, 1871

American Journal of Conchology, **7**:138.

Shell with a band of brown following the suture, especially the last, umbilicus small. This I have also compared with Atlantic specimens; the shell is more depressed, has a larger number of whorls, is smaller, with a narrow umbilicus. (Dall.)

TYPE in United States National Museum. Type locality, Monterey, California.

RANGE. Point Barrow, Arctic Ocean, to Monterey, California.

Family CAVOLINIIDAE

Genus **CAVOLINA** Abildgaard, 1791 or 1783

Shell globular, translucent; dorsal plate rather flat, produced into a hood; aperture contracted, with a slit on each side; posterior extremity tridentate. (Tryon, *Structural and Systematic Conchology.*)

TYPE. *Hyalea tridentata.*

DISTRIBUTION. Atlantic, Mediterranean, Indian Ocean. Fossil: Miocene—Sicily; Turin; Dax, Azores.

Cavolina occidentalis Dall, 1908

Bulletin, Museum of Comparative Zoölogy, **43**:233, No. 6; Pl. 12, fig. 1.

The "appareil de fermature" consists of a tooth-like process projecting on each side from the ventral plate and entering a depression in the inner side of the dorsal plate. The ventral lip is strongly constricted close to its narrowly reflected anterior margin. The posterior median spine is usually decollate at the tip. The back has a broad median and two narrower lateral obscure ridges ending at the thickened "bridle" or concentric callous ridge characteristic of this species; the ventral plate is most convex in front, where it is suddenly constricted; the portion near the aperture strongly marked by concentric whitish impressed lines with wider interspaces, though these do not interrupt the smoothness of the surface. The "hood" or produced margin of the dorsal plate, instead of being produced in a nearly continuous plate as figured by Boas for *C. tridentata* (*telemus*), is bent ventrally in a curved manner over the aperture, and about half the anterior convexity of the ventral plate is thus overshadowed. The whole shell is shorter and more globose than the Mediterranean form as figured by Boas, and the lateral slit behind the interlocking processes forms a straight, even line, not arcuate and anteriorly expanding, as in the figures referred to. The fully adult shell measures 9 mm. long, 6 mm. in greatest width, and 5 mm. in greatest convexity. (Dall.)

Type in United States National Museum, No. 110591. Type locality, Northeast Pacific between latitudes 30° and 54° N.

Range. Northeast Pacific.

Genus **CLIO** Linnaeus, 1767

Shell pyramidal, three-sided, striated transversely; ventral side flat, dorsal keeled; aperture simple, triangular, with the angles produced; apex acute. (Tryon, *Structural and Systematic Conchology.*)

Type. *Clio pyramidata* Linnaeus.

Distribution. Atlantic, Mediterranean, Indian Ocean, Pacific, Cape Horn. Fossil: Miocene—Britain.

Clio exacuta Gould, 1852

Mollusca and Shells of the United States Exploring Expedition (under Wilkes). 488; Pl. 51, fig. 605.

T. pellucida, triangularis, subtus concava, supra per convexa antice, rotundata, postice valde acuminata, lateribus concaviter arcuatis. Animal cervice longo et aliis divergentibus oblongo-ovalibus instructus. (Gould.)

The shell is an equilateral, spherical triangle, the base convexly rounded, and the sides concavely excavated, producing thus a long acute caudal

point; the under valve is slightly concave, and the upper valve very convexly arched; in front is a small opening, through which the neck of the animal passes. Length, about ½ an inch; greatest breadth, equal to about ⅔ the length. (Gould.)

TYPE in United States National Museum. Type locality, lat. 44° N., long. 154° W., that is, about 30° west of the mouth of the Columbia River.

RANGE. North Pacific Ocean, west of Columbia River.

Clio occidentalis Dall, 1871

American Journal of Conchology, **7**:140.

Shell tricarinated, transversely striated, sides a little concave, tip straight. Long., .6; lat., .45 in. (Dall.)

TYPE in United States National Museum. Type locality, North Pacific, off coast of California, in lat., 33° N., long., 130° W.

RANGE. Northeast Pacific between lat. 30° and 50° N. off the Farallon Islands.

Genus **STYLIOLA** Lesueur, 1826

Shell slender, conical, pointed, straight or curved. Fins rather narrow, truncate, with small tentacles projecting from their dorsal edges, and rudiments of the mesopodium on their surface; mantle-margin with a spiral process on the left side. M. Rang states that he has seen these *Pteropods* clustering round floating seaweed. (Tryon, *Structural and Systematic Conchology.*)

EXAMPLE. *Styliola subulata* Quoy.

Styliola falcata Gould, 1852

Mollusca and Shells of the United States Exploring Expedition (under Wilkes), 490; Pl. 51, fig. 608.

T. elongato-conica, valde recurva; apertura circularis. (Gould.)

Shell very strongly recurved, forming nearly a quarter of a circle; aperture circular. Length, not over half an inch. (Gould.)

TYPE in United States National Museum. Type locality, Northeast Pacific.

RANGE. Northeast Pacific west of Oregon.

Family CYMBULLIDAE

Genus **COROLLA** Dall, 1871

Like *Tiedmannia,* but with the body pendant below, unattached to the pinnae, ovoid, constricted above; oesophagus produced, oral aperture trumpet-shaped, produced into two points. Pinnae forming a single disk

with reticulated muscular bands, separated by a deep sinus from the oral portion. Shell entirely absent. (Dall.)

TYPE. *Corolla spectabilis* Dall, 1871.

DISTRIBUTION. Pelagic, in North Pacific.

Corolla spectabilis Dall, 1871

American Journal of Conchology, **7**: 138. *Zoologische Jahrbuch,* **250.** Heft, **1**: 67; Pl. 5, 1904.

Pinnae broadly rounded, two small indentations in the upper portion, giving it a trilobed appearance, rather than transverse, translucent yellowish, speckled with black dots on the upper margin; crossed from one side to the other by arched, broad bands of muscular fibre, which are reticulated by similar radiating bands. A deep broad sinus separates the pinnae from the parts surrounding the mouth. The orifice of the latter is trumpet-shaped, situated in a transverse cleft of the membranes which surround it and which are roundly produced on each side of it like the lower portion of a pea-blossom. Oesophagus slender, bright yellow. The neck by which the body hangs, is constricted, giving it a vase-like appearance. The intestines are variously tinted with brown, purple, and green. (Dall.)

TYPE in United States National Museum, No. 307. Type locality, North Pacific.

RANGE. North Pacific to Monterey, California, and Japan.

Family CLIONIDAE

Genus **CLIONE** Pallas, 1774

Head indistinct; tentacles six, conical, three on each side. Tooth of lingual membrane broad, convex behind, slightly two-lobed and denticulated in front; lateral teeth 12-12, simple, arched, rather swollen at the base, the outer gradually diminishing in size. (Gould, *Report on the Invertebrates of Massachusetts.*)

TYPE. *Clione borealis* Brug.

DISTRIBUTION. Arctic and Antarctic seas, Norway, India.

Clione limacina Phipps, 1773

Phipps, *Voyage to the North Pole,* 195. Pallas, *Spicilegia Zoologica,* Pl. 1, figs, 18, 19, 1774.

Nuda, corpore obconico. (Phipps.)

Corpus magnitudine pifi, in spiram ad instar helicis involutum. Alae ovatae, obtusae, espansae, corpore majores. (Phipps.)

This little animal is found where the last is (Arctic), in equal abundance, peopling as it were this almost uninhabited ocean. Martin says

that they are the chief food of the whale-bone whale; and our fishermen, who call them by the name of whale food, are of the same opinion.

RANGE. N. Bering Sea, Pribilof Islands. Circumboreal.

Clione elegantissima Dall, 1871

American Journal of Conchology, **7**:139.

Pinnae small, pink, with translucent margins, a ray of bright crimson in the center of each, subtriangular. Body pyriform, slender caudal end usually curved to one side; a patch of brownish crimson with well-defined edges, on the back, ventral side and tail, brownish pink. Head well-differentiated, longitudinally striped with carmine on a lighter ground. Tentacles two, short, cylindrical, brownish. Cephalic lobes six, thick, leaf-like, short, covered with fine granulations or pores on their anterior sides, which are flattened and of the most brilliant carmine. Disk cleft in the median line. Mouth with two broad carmine labia. Length, 28; breadth of pinnae, 22 in. (Dall.)

TYPE in United States National Museum. Type locality, Pacific Ocean, in lat. 51° 50′ N., long. 161° 26′ W.

RANGE. South of the Aleutian Islands, in lat. 51° 50′ N., long. 161° 26′ W.

Family PNEUMODERMATIDAE

Genus **PNEUMODERMA** Cuvier, 1804

Body fusiform; head furnished with ocular tentacles; lingual teeth 4.0.4; mouth covered by a large hood supporting two small, simple, and two large acetabuliferous tentacles; suckers numerous, pedicillate, neck contracted; fins rounded; foot oval, with a pointed loge, which has small branchial processes, and a minute rudimentary shell. (Woodward, *Manual of the Mollusca.*)

TYPE. *Pneumoderma peronii* Lamarck.

DISTRIBUTION. Atlantic, Indian, Pacific oceans.

Pneumoderma pacifica Dall, 1871

American Journal of Conchology **7**:139. Challenger Voyage, Reports. Pteropoda; Pl. 2, figs. 4, 5.

Body subcylindrical, elongated, rounded behind, livid purple. Pinnae subquadrate, arched at their inner anterior margin, deeply notched at their inner posterior edge. Anterior margin with a well-marked band of white, remainder dull purple, lighter behind. Head indistinct, cylindrical. Oral aperture deeply notched the median line below, entire above. Tentacles two, small, short, distant on the back of the head. Proboscis swollen

at the extremity, furnished with two long, cylindrical, tentacular, retractile, appendages. Suckers in two small, compact bunches, like bunches of grapes. These parts whitish. Pedal disk cordiform, purple with a black spot. Foot long, slender, linguliform. Branchiae short, inconspicuous. Length, 1.0; diameter of body, .3; spread of pinnae, 1.15 in. (Dall.)

TYPE in United States National Museum, No. 301. Type locality, North Pacific Ocean, lat. 37° 8′ N., long. 136° 10′ W.

RANGE. Northeast Pacific off the California coast in lat. 37° N. and northward to lat. 45° N.

Family DESMOPTERIDAE

Desmopterus pacificus Essenberg, 1919

University of California, *Zoölogical Publications,* **19,** No. 2:85; figs. 1, 2.

The body is somewhat barrel-shaped. The anterior or head end is bent ventral. The shell is absent, but the body is covered completely by a transparent integument. The strongly developed wings, the epipodea, are attached to the antero-ventral portion of the body and are fused in the middle. Their posterior margin extends beyond the posterior extremity of the body. It is deeply indented, the entire margin being divided into five distinct lobes, one median and two lateral on each side. The anterior margin of each wing is only slightly curved and is without indentations or lobes. Between the two lobes of the posterior margin of each wing are inserted the epipodial tentacles. These are short, their length being only one and one-half times their width. Each tentacle is supported with a strong nerve and is covered with cilia. Judging by each nerve supply these tentacles are sensory, probably tractile organs. The wings are supplied with well-developed nerves. One strong nerve is sent to each lobe, subdividing and spreading there into several smaller branches, and one large nerve goes to each epipodial tentacle. Long., 1–2 mm., width, 4–5 mm., measured from tip to tip of the spread wings. (Christine Essenberg.)

TYPE in University of California Collection. Type locality, off San Diego, 32° 53′ N. latitude.

RANGE. Off Southern California.

Family ACTEONIDAE

Genus **ACTEON** Montfort, 1810

Shell solid, ovate, with a conical, many-whorled spire, spirally grooved or punctate-striate; aperture long, narrow, rounded in front; outer lip

sharp; columella with a strong, tortuous fold. Operculum horny, elliptical, lamellar.

TYPE. *Tornatella fasciata* Lamarck.

DISTRIBUTION. United States, Britain, Senegal, Red Sea, Philippines, Japan, Peru. Fossil: Triassic—Lias; Pleistocene—America, Europe, South India.

Acteon traski Stearns, 1898

Plate 1, fig. 12

Proceedings of the United States National Museum, 21:297; text figure, p. 298.

Shell small, conical above, cylindrical, rather solid, opaque, somewhat glossy; sculpture consisting of numerous, fine, spiral, impressed lines or grooves, which become wider toward the base of the body whorl, making the sculpture of the lower portion of the shell lirate; part of the lirae are slightly grooved and in some cases show a tendency to run in pairs; the grooved lines are not quite regular in their relative distances, and some are deeper than others; the surface is otherwise sculptured by sharp, close-set, incremental lines; these latter are subordinate to the spiral sculpture and are more conspicuous on the lower part of the body whorl. Color dull-cream white, with (in the example before me) two obscure, broad, pale rufous bands on the body whorl. Spire short, obtusely conical. Whorls six (probably apex in example somewhat eroded); suture distinct, narrowly channeled. Aperture about two-thirds the length of the shell (not quite 9 mm.), acutely angular above, rounded and effuse below, finely lirate and glossy within, with a thin glazing on the body whorl. Outer lip thin, simple. Columella short and flexuous, with a conspicuous fold, curving around the same and thickening the edge of the lip, which is moderately produced in the umbilical region. Length of shell, 11; length of body whorl, 9; breadth, 6 mm. (Stearns.)

TYPE in United States National Museum, No. 148241. Type locality, San Diego, California.

RANGE. San Diego, California, to Panama. Fossil: Pleistocene; described from a fossil.

Subgenus RICTAXIS Dall, 1871

Acteon punctocoelata Carpenter, 1864

Plate 1, figs. 17, 17*a*

Supplementary Report, British Association for the Advancement of Science, 1:307.

T. t. tenui, satis elongata, ovoidea; cinerea, fasciis duabus latis fuscis ornata; vertice nucleoso decliviter caelato; anfractibus normalibus 4 vix

convexis, suturis distinctis; toto superficie sulcis subdistantibus coelata, punctis impressis seriatim dispositis, quarum 7–9, in spira monstrantur; basiovali; apertura latiore; labro acuto, antice sinuato; labio indistincto; plica acuta declivi juxta parietem, haud exstante; columella antice torta. Long., .2; long. spir., .06; lat., .09, poll. (Carpenter.)

Shell oblong with conoidal spire; white with two broad ashy or brown zones. Whorls 5, convex, separated by impressed and narrowly channeled sutures. Surface sculptured throughout with spiral equidistant conspicuously punctate grooves, the raised intervals smooth except for a fine engraved line along the middle of each. Grooves on the body-whorl about 26. Aperture two-fifths to two-thirds the length of the shell. Columella having a spiral fold above, obliquely truncated at base. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE in United States National Museum. Type locality, Santa Cruz, California?

RANGE. Monterey, California, to Magdalena Bay, Lower California. Fossil: Pleistocene, Santa Barbara, to San Diego, California.

This was described as *Tornatella punctocoelata* by Carpenter.

Acteon punctocoelata vancouverensis, n. subsp. 1927

Plate 1, figs. 19, 20

The shell is shorter and broader, and the spire is much lower than the typical species; sutures are not so distinct; color and sculpture much the same. So far as is known the typical species has not been reported from north of San Francisco, California. Length, 10; breadth, 6 mm.

TYPE in Oldroyd Collection, Stanford University. Type locality, Departure Bay, Vancouver Island, British Columbia, in 3 fathoms.

RANGE. Known only from type locality.

Figure enlarged twice.

Acteon painei Dall, 1903

Plate 1, fig. 18

Proceedings of the Biological Society of Washington, **16**:172.

Shell with one smooth, polished, nuclear and three or more subsequent strongly sculptured whorls; apex sinistral, immersed; spire very short and blunt; body stout, ovate, slightly peripherally flattened; sculpture of strong, subequal, spiral riblets, covering the whole shell, separated by slightly narrower, coarsely punctate channels; outer lip sharp; pillar obliquely subtruncate in front, twisted, vertical, with a prominent plate-like edge, and a moderately prominent plait about midway of the exposed

portion; body with a very thin wash of callus; color of the shell yellowish subtranslucent white. Length of shell, 8; of aperture, 7.25; breadth of shell, 5 mm. (Dall.)

TYPE in United States National Museum, No. 109301. Type locality, near Avalon, Catalina Island.

RANGE. Catalina Island, in 50 fathoms.

Genus **MICROGLYPHIS** Dall, 1902

This is a group of chiefly deep-water species, characterized by a very short spire and globose shell in which the end of the pillar is not only truncate as in *Rictaxis*, but has a marked sulcus behind it and is produced laterally into a rather wide spiral flange at maturity, and is concave with a single feeble plait behind the terminal laminae. Inoperculate. (Dall.)

TYPE. *Actcon curtulus* Dall.

Microglyphis breviculus Dall, 1902

Plate 1, fig. 14

Proceedings of the United States National Museum, **24**:512; *Bulletin,* Museum of Comparative Zoölogy, **43**; Pl. 15, fig. 12.

Shell small, short, plump, yellowish-white, with four and a half polished whorls; nucleus sinistral but wholly immersed, so that the apex seems as if dextral, smooth; whorls convex, rapidly increasing, separated by a deep, almost channeled, very narrow suture; sculpture of extremely faint, fine spiral striae almost absent in front of the suture and growing more distinct anteriorly, not visibly punctate; aperture ample, outer lip simple, body with a well-marked callus, continued on to the pillar and spreading a little over the base behind the pillar, which is concavely arcuate, its anterior edge thickened and expanded into a strong spiral plait or lamina behind which on the pillar is a second less-marked plait; in front of the pillar is a small but distinct notch. Length, 3.6; max. diameter, 2.25 mm. (Dall.)

TYPE in United States National Museum. Type locality, off Santa Rosa Island, United States Fish Commission Station 2902.

RANGE. Monterey, California, to Point San Quentin, Lower California.

Microglyphis estuarinus Dall, 1908

Bulletin, Museum of Comparative Zoölogy, **43**, No. 6, p. 238.

Shell small, white, plump, with a very short, rather acute spire, and a swollen last whorl; there are four and a half closely-coiled whorls, the

nucleus being sinistral and sunken; when fresh, the shell is of a translucent pinkish white, the thicker parts near the suture are more opaque and give the effect of a white band in front of the suture; the general form resembles that of *A. (M.) curtulus*, though the shell, with the same number of whorls, is much larger, the spire less evenly dome-like, and the nucleus more sunken; suture very distinct, almost channeled; sculpture of fine, close-set, minutely punctate spiral lines, hardly visible without a lens; aperture with a well-marked anterior sulcus or canal; anterior plait on the pillar strong, prominent, the posterior plait weaker, and ending further within the aperture, but quite distinct. A very thin wash of callus on the body; outer lip thin, simple. Alt., 5.5; diam., 3.7; spire above the last whorl, 1.0 mm. (Dall.)

TYPE in United States National Museum. Type locality, U.S.S. "Albatross" Station 3194, off Estero Bay, California, in 92 fathoms.

RANGE. Straits of Juan de Fuca to Gulf of California.

Family ACTEOCINIDAE

Genus **ACTEOCINA** Gray, 1847 (Tornatina)

Shell cylindrical or fusiform, involute, covered with an epidermis; spire distinct, produced, apex mamillated, suture canaliculated; aperture narrow, linear; inner lip callous, furnished at the fore part with a single plait; outer lip straight, simple. (A. Adams.)

TYPE. *Tornatina voluta* Quoy and Gainard.

DISTRIBUTION. West Indies, United States, Mediterranean, Philippines, China, Australia; on sandy bottoms, ranging to 35 fathoms. Fossil: Tertiary.

This is the genus *Tornatina* of A. Adams, and I have used his description.

Acteocina culcitella Gould, 1852

Plate 2, figs. 1*a*, *b*, *c*

Boston Journal of Natural History, 6:377; Pl. 14, fig. 8.

Shell ovoid-cylindrical, rather solid, bluish-white, covered by a rough straw-colored epidermis: whorls five, the anterior one elongated, somewhat fusiform, rounded anteriorly, sculptured with fine, close-set, revolving striae, more distinctly indicated when the epidermis is present; the four posterior whorls form a conical spire, having a suture so profound that they seem invaginated and quite detached from each other. Aperture

linear, widening anteriorly, and in front somewhat trigonal. Inner lip formed by a sharp, very prominent, abruptly twisted, white fold, with submarginal excavation, terminating acutely in front, in such a manner as almost to form a canal. Length, 1 inch; breadth ¼ of an inch. (Gould.)

TYPE in? Type locality, Santa Barbara, California.

RANGE. Kodiak Island, Alaska, to California.

Described as *Bulla (Tornatina) cerealis.*

Acteocina eximia Baird, 1863

Plate 2, fig. 6

Proceedings, Zoölogical Society of London, 67.

B. testa cylindracea, viridi-lutescente, striata; striis minutis, confertis, undulatis; spira concava, excavata; apertura longa, ad basim effusa; labro acuto, columella prope basin subito arcuata. Long., ½ in. (Baird.)

Shell cylindrical, and minutely striated with numerous flexuous lines. The spire is very short and concavely excavated; while the aperture is of considerable length, and the columella at the base suddenly arched. (Baird.)

TYPE in British Museum. Type locality, Esquimalt Harbor, Vancouver Island.

RANGE. Kodiak Island, Alaska, to Puget Sound.

Described as *Bullina (Tornatina) eximia.*

Acteocina oldroydi Dall, 1925

Plate 2, fig. 4

Nautilus, **39**: 25.

Shell small, solid, subcylindric, white, with three and a half whorls; suture narrow, channeled; spire short and rather blunt, the specimen has the entire surface decorticated, so that the surface characters cannot be definitely described, but indications are that the incremental lines are rather rude and irregular; the base is rounded, with a deep chink, almost an umbilicus behind the anterior portion of the inner lip; the shell is very slightly constricted medially; the aperture is narrow behind, the posterior commissure rounded, falling short of reaching the suture; the anterior part of the aperture is wide, rounded evenly into the pillar lip, which shows no plait; the entire lip is thin and sharp, with a thin layer of enamel on the body. Length of shell, 8.5; of aperture, 6.5; maximum diameter, 4.5 mm. (Dall.)

TYPE in United States National Museum, No. 333664. Type locality, Departure Bay, British Columbia.

RANGE. Known only from type locality.

Acteocina smirna Dall, 1919

Proceedings of the United States National Museum, **56**:296.

Shell minute, white, with yellowish periostracum, of about four whorls with a very minute subglobular hardly projecting glossy nucleus; summit of spire with the whorl but little raised, flattish but not excavated between the suture and the bluntly-rounded shoulder; shell in front of the shoulder subcylindric, with fine axial incremental lines; aperture narrow, outer lip thin, nearly straight, rounding in front into rather wide, slightly excavated pillar, which near the body carries a single strong plait; body with a thin coat of enamel, the umbilical region slightly impressed but imperforate. Length, 4; diameter, 2 mm. (Dall.)

TYPE in United States National Museum, No. 271492. Type locality, San Diego, California.

RANGE. San Diego, California, to San Salvador.

This *Tornatina infrequens* Carpenter, not C. B. Adams.

Acteocina inculta Gould, 1856

Proceedings, Zoölogical Society of London, 203, 1856. Tryon and Pilsbry, *Manual of Conchology,* **15:** Pl. 59, fig. 15.

T. t. minuta, eburnea, solidula, elongata-ovali, longitudinaliter minutissime striata; spira elevata, anfr. iv. tabulatis; apertura $\frac{7}{8}$ longitudinis testae adaequante, antice dilatata; labro inflexo, postice rotundato; columella arcuata, callosa, uniplicata. (Gould.)

Pacific Railroad (Preliminary Report, 1855).

Shell minute, solid, ivory-white, elongate-oval, minutely striated longitudinally; spire elevated, consisting of about four tabulated whorls. Aperture about seven-eighths the length of the shell, not attaining the end of the outer whorl, linear, constricted at the middle and somewhat dilated anteriorly, posterior angle rounded; pillar moderately arcuate, usually presenting a well-marked fold at the anterior fourth, and well-coated with enamel. Length, $\frac{1}{8}$; breadth, $\frac{1}{12}$ in. (Gould.)

TYPE in United States National Museum. Type locality, San Diego, California.

RANGE. Monterey, California, to Gulf of California.

Acteocina infrequens C. B. Adams, 1852

Panama Shells, 214.

Shell cylindric, not compressed about the middle; white; smooth; apex papillary, very minute and prominent; spire moderately elevated, convex; whorls four and one-half, acutely shouldered, with a deeply channeled

suture; aperture long and narrow, anteriorly rounded; labrum very thin, much advanced along the middle; columella terminating in a very robust spiral plait. Length, .28; breadth, .11; length of spire, .03 in. (C. B. Adams.)

TYPE in Amherst College. Type locality, Panama.

RANGE. Santa Monica, California, to Panama.

Described as *Bulla (Tornatina) infrequens.*

Acteocina carinata Carpenter, 1857

Catalogue of the Collection of Mazatlan Shells, 171.

T. t. cylindracea, alba, laevi, infra suturam appressam acute carinata; inter suturam et carinam excavata; anfr. v. quarum duo primi discoidales, ad spiram verticaliter affixi; aspira plus minusve extante; apertura praelonga, labro acuto, in medio producto, postice ad suturam vix canaliculato; labro tenui; pariete ad basim tumida; columella plica infra parietem robusta spiraliter munita. Largest specimen, long., .11; long, spir., .02; lat., .05. (Carpenter.)

Shell cylindrical, white, smooth, acutely carinated below the appressed suture, between the suture and the carine excavated. Whorls 5, the two earlier discoidal and affixed vertically upon the spire, which is more or less apparent. Aperture elongate, the lip acute and produced in the middle, slightly sinused behind; inner lip thin, swollen above the junction with the columella proper. Columella provided with a stout spiral fold where it joins the parietal wall. (Carpenter.) (Tryon and Pilsbry, *Manual of Conchology.*)

Known from *T. infrequens* (1) by the smaller size, and more irregular spire; (2) by the suture, which is not channeled; (3) by the shoulder, which is sharply carinated, with the space hollowed between the keel and suture; (4) by the swelling of the body whorl at the base; and (5) by the plait which runs more transversely, below the body whorl, instead of obliquely, almost on it, as in *T. infrequens.* (Carpenter.)

TYPE in British Museum. Type locality, Mazatlan, Mexico.

RANGE. San Diego, California, to Gulf of California.

Acteocina planata Carpenter, 1865

Journal de Conchylologie, **13**: 139.

C. t. parva, cylindracea, subelongata, alba, laevis, epidermide straminea induta; marginibus fere parallelis; spira planata, haud umbilicata, haud mamillata; anfractibus 4 convolutis, suturis parum impressis; basi modice effusa; labro tenui, in medio satis producto, antice late arcuato, postice

parum sinuato, haud canaliculato, suturam versus satis rotundato; labio distincto, postice subcalloso; columella plica satis exstante, axi basim circumgyrante. Long., .11; lat., .055 poll. (Carpenter.)

On n'a trouvé qu'un seul échantillon de cette petite espéce, qui est intermediare entre les *Cylichna* et les *Tornatina*. (Carpenter.)

Shell small, cylindrical, subelongate, white, smooth, covered with a straw-colored epidermis; margins nearly parallel; spire flat, hardly umbilicated, slightly mammillate. Whorls 4, convoluted, sutures little impressed; base moderately effuse; lip thin, rather produced in the middle, broadly arcuate in front, a little sinuous behind, scarcely channeled; toward the sutures quite rounded. Inner lip distinct, somewhat calloused behind; columella with quite a marked fold, the axis revolving around the base. Alt., .11; diameter, .055 in. (Tryon and Pilsbry, *Manual of Conchology.*)

Type in? Type locality, San Diego, California.

Range. Known only from type locality.

Acteocina magdalenensis Dall, 1919

Plate 2, figs. 2*a*, *b*

Proceedings of the United States National Museum, **56**:296.

Shell small, slender, subcylindric, translucent white, polished, with four whorls, the nucleus minute, subglobular, transparent; suture distinct, more or less channeled, spire short but distinctly turreted, aperture narrow, outer lip straight, rounding below into the thickened pillar which has a strong plait with a groove behind it, the body with a slight glaze. Length, 6.7; diameter, 2.5 mm. (Dall.)

Type in United States National Museum, No. 21841. Type locality, Magdalena Bay, Lower California.

Range. Southern California to Magdalena Bay, Lower California.

A new name for *Acteocina infrequens* Carpenter, not of C. B. Adams.

Genus **RETUSA** Brown, 1827

Shell small, subcylindrical, imperforate, with slightly raised flat, or depressed spire, the aperture as long, or nearly as long, as the shell, narrow above, dilated below. Columella thickened, with a small fold or none. The species of this genus might be distributed into two groups, as Fischer has done. Part of them have a distinct fold on the columella. The other species have no distinct columellar fold, although the pillar-lip is thickened; and these fall into *Utriculus* as understood by Sars, Fischer, Dall, and others. (Tryon and Pilsbry, *Manual of Conchology.*)

Type. *Bulla truncatula* Bruguiere, 1772.

Distribution. Mediterranean, United States, Britain, North Atlantic.

Retusa semen Reeve, 1856

Plate 2, fig. 13

Belcher, *Last of the Arctic Voyages,* **2**:393.

B. semen Bul. testa cylindraceo-ovata, tumidiuscula, spira depresso-convexa, sutura impressa, anfractibus laevibus, convesiusculis, ultimo antice paululum descendente; fulvescente-alba.

Of a short cylindrical form, somewhat swollen, with a depressly convex spire, having the suture faintly channeled. (Reeve.)

TYPE locality, Port Refuge; Nova Zembla.

RANGE. Off Point Collinson, Arctic; also Atlantic.

Described as *Retusa semen.*

Retusa obtusa Montagu, 1803

Testacea Britannica, **1**:223; Pl. 7, fig. 3.

With a moderately strong, subcylindric, opaque-white shell, wrinkled longitudinally; apex convoluted, obtuse; volutions four or five, very little produced; aperture nearly the whole length of the shell, narrow, rather more compressed in the middle, dilated at the base; inner lip thickened, smooth, white. Length $\frac{2}{10}$, rarely $\frac{1}{4}$ in.; breadth, about half its length. (Montagu.)

TYPE in? Type locality, England.

RANGE. Arctic Ocean to St. Mathews Island. Circumboreal.

Retusa pertenuis Mighels, 1843

Boston Journal of Natural History, **4**:346; Pl. 16, fig. 3.

Shell very small, cylindrical, of a dingy white color, very thin and fragile; whorls four, rounded, all lying in the same plane; suture distinct, as seen under the microscope; spire elevated; labrum nearly straight at the posterior part, rounded anteriorly, returning into the shell it forms a delicate, slightly elevated lamina, which, under the miscroscope, is seen to occupy nearly the whole length of the columella region; aperture very narrow posteriorly, broad and rounded anteriorly. Length, .08; breadth, .04 in. (Mighels.)

TYPE is lost. Type locality, Casco Bay, Maine.

RANGE. Arctic Ocean; Bering Sea; also Atlantic.

Mighels' types were placed in Museum, Portland, Maine, which was burned.

SECTION COLEOPHYSIS Fischer, 1883

Retusa harpa Dall, 1871

Plate 2, fig. 3

American Journal of Conchology, **7**:136; Pl. 15, fig. 11.

Shell small, white, of four and a half whorls; tabulate and sharply carinate above, characterized by sharp grooves and raised lines, parallel with the lines of growth, which extend half over the whorls and become obsolete anteriorly. Apex mammillated, minute, globular, prominent, suture canaliculated. Anterior portion of the last whorl smooth. Last whorl slightly narrower above. Aperture long, narrow, effuse below, with a deep narrow sinus at the suture. Columella thickened with a thin layer of white callus. Columellar plait obsolete in the adult, rather prominent in young shells. Carina intersected by the grooves and slightly dentate. Long., .24; lat., .12 in. (Dall.)

TYPE in United States National Museum. Type locality, Monterey, California.

RANGE. Queen Charlotte Islands, British Columbia, to San Diego, California.

SECTION SULCULARIA Dall, 1920

Retusa xystrum Dall, 1919

Plate 2, fig. 10

Proceedings of the United States National Museum, **56**:297.

Shell minute, white, subcylindrical, the aperture as long as the shell, whorls involuted, with a deep pit at the apex, slightly wider in front; very little constricted around the middle; sculpture of extremely fine, close, longitudinal grooves covering the whole surface; the base produced, imperforate; the aperture very narrow, outer lip straight, as long as the shell, simple, sharp, rounding into the base. Length of shell, 3; max. diam., 1 mm. (Dall.)

TYPE in United States National Museum, No. 273985. Type locality, San Diego, California.

RANGE. San Pedro to San Diego, California.

Genus **VOLVULELLA** Newton, 1891

Shell external, subcylindrical or long-oval, tapering at both ends, the body-whorl more or less produced in a beak or spine above. Spire concealed; aperture as long as the shell, very narrow, the outer lip simple,

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produced above; columella somewhat thickened, with the trace of a fold. This is the description of A. Adams' genus *Volvula*.

TYPE. *Volvula acuminata* Sowerby.

DISTRIBUTION. Britain, Mediterranean, Asia, United States. Fossil: Pliocene-Pleistocene.

Volvulella cylindrica Carpenter, 1863

Plate 2, fig. 9

Supplementary Report, British Association for the Advancement of Science, 647. *Annals and Magazine of Natural History,* ser. 3, **15**:179, 1856.

V. testa cylindracea, alba, nitente, striis spiralibus distantibus cincta; medio planato, marginibus fere parallelis; antice satis effusa, postice subito angustata; canali brevissimo; labro acuto; labio indistincto; plica columellari parva, valde declivi. Long., .17; lat., .17. (Carpenter.)

Shell cylindrical, white, shining, encircled by distant spiral striae; flattened in the middle, the margins nearly parallel, rather effuse below, suddenly narrowed behind; canal very short; lip acute; inner lip indistinct; columellar fold small, very sloping. (Carpenter.)

TYPE in the Boyce Collection. Type locality, Santa Barbara, California.

RANGE. Vancouver Island to Gulf of California.

Volvulella cooperi Dall, 1919

Proceedings of the United States National Museum, **56**:297.

Shell subcylindrical, white, in the young with a very short spine, the adult having the spine obsolete or even absent, involuted, bluntly rounded at each extremity, the aperture as long as the shell; surface entirely smooth; aperture parallel with the body, very narrow, body with no perceptible enamel, pillar very short, thickened, slightly reflected with a minute chink behind. Length, 9.5; diameter, 3.6 mm. (Dall.)

TYPE in United States National Museum, No. 105501. Type locality, Scammons Lagoon, Lower California.

RANGE. Point Sur, California, to Scammons Lagoon, Lower California.

Volvulella californica Dall, 1919

Plate 2, fig. 11

Proceedings of the United States National Museum, **56**:298.

Shell minute, polished, white, elongate-ovate, involved, with a short apical spire; axial sculpture of very faint incremental lines; spiral sculpture of microscopic striae near the anterior end; axis imperforate; aper-

ture as long as the shell, outer lip reaching to the end of the spine, from which it is separated by a narrow groove, laterally straight, anteriorly rounding to the slightly thickened pillar; body with a coat of enamel which extends to the pillar and the spine. Length, 4; diameter, 1.7 mm. (Dall.)

TYPE in United States National Museum, No. 211303. Type locality, United States Fish Commission Station 2902, off Santa Rosa Island, California.

RANGE. Santa Rosa Island to San Diego, California.

Family SCAPHANDRIDAE

Genus **SCAPHANDER** Montfort, 1810

Shell oblong, convolute; spirally striated; aperture much expanded in front; spire concealed; epidermis thick; lingula teeth 1.0.1, crested.

TYPE. *Bulla lignaria* Linnaeus.

DISTRIBUTION. United States, Norway, Britain, Mediterranean, on sandy ground to 50 fathoms.

Scaphander willetti Dall, 1919

Proceedings of the United States National Museum, **56**:299.

Shell small, yellowish-white, of about four whorls, the apex sunken but exposed in a pit bounded by a sharp carina, the shell wider anteriorly; surface with faint incremental lines crossed obliquely by minute vermicular sculpture, which is more nearly spiral about the middle of the shell and visible only under the lens; aperture narrow behind, wider and produced in front, the edge of the outer lip produced to form the apical carina, laterally straight and rounded to the pillar in front; umbilical region covered with a smooth layer of enamel, pillar concave, axis twisted. Height, 12.5; maximum diameter, 7; diameter at apex, 2 mm. (Dall.)

TYPE in United States National Museum, No. 216405. Type locality, Forrester Island, Alaska.

RANGE. Forrester Island, Alaska.

Genus **ATYS** Montfort, 1810

Shell rather solid, unicolored, with a smooth epidermis; usually spirally striated; spire scarcely visible; aperture longer than the inner margin at both ends; columella with a single, more or less obsolete plication.

TYPE. *Atys naucum* Linnaeus.

DISTRIBUTION. In all temperate and tropical seas.

Atys casta Carpenter, 1864

Annals and Magazine of Natural History, ser. 3, 13:314.

A. testa longata, tenui, subdiaphana, albida; antrorsum paulum tumidiore; spira celata, lacunata, (t. adulate) haud umbilicata; columella paulum intorta, effusa; umbilico antico minimo; labro postice producto, obtuse angulato; toto superficie subtiliter spiraliter striatula. Long., .4; lat., .18 poll. (Carpenter.)

Shell elongated, thin, subdiaphanous, whitish; a little more swollen anteriorly; spire concealed, lacunate, in adult shells hardly umbilicated; columella a little intorted, effuse; umbilicus small; lip produced posteriorly, obtusely angulated; entire surface subtly spirally striatulate. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE in British Museum. Type locality, Cape San Lucas, Lower California.

RANGE. Catalina Island, California, to Gulf of California.

Atys nonscripta A. Adams, 1850

Thesaurus Conchyliorum, 588; Pl. 125, fig. 125.

B. testa ovato-cylindrica, alba, subpellucida, longitudinaliter striata, postice subtruncata, antice producta; labro subrecto; labio antice valde truncato, in plica dentiformi desinente. (A. Adams.)

Shell ovately cylindrical, white, subpellucid, longitudinally striated, posteriorly subtruncated, anteriorly produced; outer lip rather straight; inner lip anteriorly strongly truncated, ending in a tooth-like plait. (*Thesaurus Conchyliorum.*)

TYPE in British Museum. Type locality not given.

RANGE. San Diego, California.

Described as *Bulla nonscripta.*

Family DIAPHANIDAE

Genus **DIAPHANA** Brown, 1827

Shell thin and fragile, capacious or subglobose, umbilicated, the spire either projecting flat, or sunken in a narrow apical umbilicus. Aperture narrowed above, rounded below, the lip sinuous; columella not thickened, long and rather straight, neither folded nor truncated, its edge a little reflected above.

TYPE. *Diaphana minuta* Brown.

DISTRIBUTION. Northern United States, Europe.

Diaphana brunnea Dall, 1919*

Plate 2, fig. 15

Proceedings of the United States National Museum, **56**:299.

Shell small, reddish-brown, thin, with a small subglobular nucleus and about three whorls, separated on the flattish summit by a rather deep suture; the last whorl rather large, swollen, widest in front; surface smooth; aperture not quite as long as the shell, narrow behind, expanded in front; outer lip thin, nearly straight, rounding into the pillar lip, which is reflected over but does not close a narrow umbilical chink; inner lip thinly glazed, the axis not gyrate. Height of shell, 5; diameter, 3.5 mm. (Dall.)

TYPE in United States National Museum, No. 208718. Type locality, Harbor of St. Paul, Kadiak Island, Alaska.

RANGE. Kadiak Island, Alaska.

* In *Marine Shells of Puget Sound and Vicinity,* I. S. Oldroyd, March 1924, the writer placed by mistake the description of *Scaphander willetti* Dall under *Diaphana brunnes* Dall.

Diaphana californica Dall, 1919

Plate 2, fig. 12

Proceedings of the United States National Museum, **56**:299.

Shell translucent and whitish, thin, the brown soft parts showing through, subcylindric, the nucleus minute, globular, with about three subsequent whorls; the spire blunt with the whorls rounded narrowly above a deep suture; surface except for faint incremental lines, polished; aperture as long as the shell, posterior sulcus small, outer lip thin, sharp, straight, axis imperforate, pillar lip thin, body hardly glazed. Height, 4.5; diameter, 2.5 mm. (Dall.)

TYPE in United States National Museum, No. 130561. Type locality, Long Beach, California.

RANGE. San Pedro, California, to South Coronado Island, Mexico.

Diaphana globosa Loven, 1846

Index Molluscorum Scandinaviae, 11. *Mollusca regionis arcticae Norvegiae,* Pl. 18, fig. 4.

T. perforata, tenuissima, hyalina, epidermide tecta, subglobosa, postice leviter, angustata, truncata; anfractibus spirae 2–3, sutura canaliculata distincti; apertura; obpyriformis, antice, postice sinum angustum praebens; labrum sub angulo obtuso abiens, dem deflaxum, leviter impressum, antice large arcuatum, productum; columella subrecta, leviter recedens, vix reflecta; umbilicus parvus subobtectus. Long., 4 mm. (Loven.)

Shell very thin, vitreous, subglobose; base obliquely rounded; vertex narrowly truncated, narrowly perforated, the spire nearly concealed. Aperture as long as the shell, narrow and supine above, expanded below; outer lip produced above the vertex and subangulate, obliquely arcuate below; columella flexuous, umbilicus distinct. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE not known to writer. Type locality, Scandinavia.

RANGE. Bering Sea and Arctic Ocean; circumboreal (Krause.)

Genus **BROCKTONIA** Iredale, 1915

The shell resembles *Cylichna* (*Bullinella* Newton), but has the spire almost concealed. (Dall.)

DISTRIBUTION. California.

Brocktonia polystrigma Dall, 1908

Proceedings of the United States National Museum, **34**:246.

Shell small, white, barrel-shaped, with the posterior part of the outer lip extending slightly beyond the apex of the shell; form much as in *Haminea solitaria* Say; apex sunken, imperforate, the spire concealed; outer lip partly membranous and contracting in drying; the shell normally covered with a thin periostracum, which in drying splits and contracts; sculpture of close numerous, spiral rows of emphatic punctations, covering the shell; aperture ample; outer lip thin and submembranous, its posterior extremity rounded over evenly to the suture, the anterior part not expanded; pillar lip thin; arcuate, the margin reflected, forming a gutter just outside the margin; body with little callus, only one whorl visible. Length of shell, 2.8; max. diameter, 2.2 mm. (young shell). (Dall.)

TYPE in United States National Museum, No. 110649. Type locality, off entrance to San Diego Harbor, in 50 fathoms.

RANGE. San Diego, California.

Genus **CYLICHNELLA** Gabb, 1872

Shell subcylindrical, spire sunken; mouth narrow behind, widened or advanced columella with two folds. (Gabb.)

This genus has the external form of *Cylichna,* but it has two distinct folds. The upper one is sharp and prominent like that of *Actaeon,* while the lower is more oblique and winds around the columella more like that of *Cylichna.* (Gabb.)

TYPE. *Cylichnella bidentatus* Orbigny.

DISTRIBUTION. Chiefly deep-water shells, United States, Britain, Red Sea, Greenland, Australia. Fossil: Triassic to Pleistocene.

Subgenus BULLINELLA Newton, 1891

Cylichnella alba Brown, 1827

Plate 2, fig. 5

Illustrations of the Conchology of Great Britain, 3; Pl. 19, figs. 43, 44.

Shell subcylindrical, bulging in the center, thin, smooth, glossy and white; aperture the whole length of the shell, a little compressed in the center, and dilated toward the base; outer lip thin, pillar lip thickened at the base, with a very slight duplicature at the bottom of the columella; no visible spire, but its apex slightly subumbilicated. Length not quite three-eighths of an inch; breadth, an inch and a half. (Brown.)

TYPE not known to writer. Type locality, Greenock.

RANGE. Arctic Ocean to San Diego, California; circumboreal. Fossil: Pleistocene—Santa Barbara, Ventura, San Pedro, San Diego; Pliocene—San Diego well.

Cylichnella nucleola Reeve, 1855

Last of the Arctic Voyages, 2:393; Pl. 32, fig. 2.

Testa oblongo-cylindracea, medio subcoarctata, laevigata vel striis incrementi aecuatim notata, apice angulato-immersa, sulco latiusculo; fulvo-castanea. (Reeve.)

Of a compressly oblong-cylindrical form, with the spire so impressed as to show a broad internal groove, the young shell being coated throughout with a dark fulvous-chestnut cuticle. (Reeve.)

TYPE in British Museum. Type locality, North of Beechy's Island, Arctic.

RANGE. Grantly Harbor, Port Clarence, Bering Strait; circumboreal.

Described as *Bulla nucleola.*

Cylichnella occulta Mighels, 1841

Proceedings of the Boston Society of Natural History, 1:50. *Boston Journal of Natural History,* 4: Pl. 14, fig. 11.

B. testa parva, ovato-cylindracea; spira occulta; labro supra elevato, medio recto; apertura sub-angusta, infra lata, rotundata. Length, .2; breadth, .15 in. (Mighels.)

Shell solid, white, covered with a very thin, whitish-yellow epidermis; ovate, rather short and swollen, the diameter about two-thirds the altitude.

Vertex obtusely truncated, slightly concave in the middle; base rounded; aperture not very narrow, dilated below, the outer lip projecting above the crown of the shell, a little arcuate and inflexed in the middle; columella nearly straight, with a broad fold. Surface smooth, polished, shining, but covered with many impressed undulating lines, which are quite conspicuous. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE in Boston Society of Natural History? Type locality, Westbrook, Maine. Described from a fossil.

RANGE. Point Barrow, Aleutian Islands; circumboreal.

Cylichnella diegensis Dall, 1919

Proceedings of the United States National Museum, **56**:300.

Shell small, thin, cylindric, white, with a pale straw-colored periostracum with reddish brown spiral lines on the base and near the apex; whorls involved, the apex exhibiting a funicular depression ending in a minute perforation; the surface smooth and polished except for faint incremental lines; aperture very narrow, the outer lip thin, straight, recurving deeply around the apex, at the base receding and rounding into the simple, thickened pillar lip; body with a slight glaze. Length, 8; diameter, 3.5 mm. (Dall.)

TYPE in United States National Museum, No. 209071. Type locality, United States Fish Commission Station 4359, off Point Loma, San Diego County, California.

RANGE. San Diego, California, to Cape San Lucas; Vancouver Island.

Cylichnella attonsa Carpenter, 1865

Plate 2, fig. 8

Proceedings, Philadelphia Academy of Natural Sciences, 58.

C. t. *C. cylindricae* aliter simillima; sed postice rotundata, haud umbilicata, vix lacunata, labro regulariter incurvato. Long., .38; lat., .15. (Carpenter.)

"Rounded off at apex." (Carpenter.)

Shell elongate, cylindrical; sides straight; white with a light-colored epidermis; with a tracing of orange around the outer edge of the inner lip. Aperture very narrow for two-thirds of the length, and widening out below. Columella slightly twisted; sculpture consists of fine hair lines running concentrically around the shell. (Oldroyd.)

TYPE in Philadelphia Academy of Natural Sciences. Type locality, Puget Sound.

RANGE. Puget Sound to San Diego, California.

Family BULLARIIDAE

Genus **BULLARIA** Rafinesque, 1815

Shell oval or ovate, compactly involute, generally solid and with a mottled color-pattern; spire sunken, umbilicated. Aperture as long as the shell, rising slightly above the vertex; its upper portion narrow, expanded toward the base; lip simple, flexuous; columella short and concave, with a crescentic, white, reflexed callus; parietal wall smooth, with a light parietal callus. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE. *Bulla ampulla* Lamarck.

DISTRIBUTION. Mediterranean, Atlantic, Gulf of Mexico, Indo-Pacific, west coast North America.

Bullaria gouldiana Pilsbry, 1893

Manual of Conchology, **15**:340; Pl. 36, figs. 22–24.

Shell large, ovate or oval, thin; pinkish fawn-colored dappled with slate-black spots, each shading into the ground-color on the right and bordered with whitish on the left, or with similarly shaded ≷-shaped or V-shaped markings; covered when fresh by a yellowish-brown or mahogany epidermis. Surface smoothish, with irregular growth-wrinkles; showing under a strong lens an extremely minute granulation. Apex narrowly umbilicated, the interior of the perforation showing no spiral striae, or but a few in its depth. Columella thickened with crescentic callus. Interior of mouth showing the external markings viewed by reflected light. Alt., 55; diam., 37 mm. (Pilsbry.)

TYPE in British Museum. Type locality, Guaymas, Mexico.

RANGE. Santa Barbara, California, to Mazatlan, Mexico.

This is the shell we have called *Bulla nebulosa* Gould. Gould's type is in the State Museum at Albany, No. 169, and his type locality is given as San Diego, California.

Bullaria quoyana Dall, 1919

Proceedings of the United States National Museum, **56**:300. *Manual of Conchology,* **15**: Pl. 37, fig. 39.

B. testa ovata, ventricosa, sublaevigata, vertice profunde umbilicata, fusco alboque variegata; labro acuto, arcuato. (A. Adams.)

Shell ovate, ventricose, rather light and thin; apex umbilicated, variegated with white and fuscous; outer lip acute, arcuated. (Sowerby.)

TYPE in British Museum. Type locality, Galapagos Island.

RANGE. Catalina Island.

This is *Bulla quoyi* A. Adams, 1850, but not Gray, 1843. (Dall.)

Family AKERIDAE

Genus **HAMINOEA** Turton, 1830

Shell thin and fragile, unicolored, corneous, yellowish or greenish, covered with a thin cuticle, globose, ovate or cylindric-oval, the spire sunken and concealed, vertex concave, imperforate or minutely perforate; body whorl large; aperture as long as the shell, broadly rounded below, narrow above; columella simply concave, thin, its edge narrowly reflexed, showing a slight fold where it joins the body of the shell; lip retreating above, but not distinctly sinused.

TYPE. *Bulla hydatis* Linnaeus.

DISTRIBUTION. Europe, West Atlantic, West Indies, west America, Japan, China, Polynesia, Australia, New Zealand.

Haminoea virescens Sowerby, 1833

Genera of Shells, Bulla, fig. 2.

Shell open, subpyramidal, patulous, green, semipellucid, contracted above the middle, elevated above the spire, acuminated, very minutely transversely striated; aperture anteriorly largely expanded; columella very obliquely arched. Alt., 14, diam., 10½ mm. (Sowerby.)

TYPE in British Museum. Type locality, Pitcairn's Island.

RANGE. Santa Barbara, California, to Puerto Libertad, Mexico. Pleistocene: San Pedro; Pliocene: Caloosahatchie beds, Florida. (Dall.)

Haminoea vesicula Gould, 1855

Pacific Railroad Surveys, Appendix, **5:** 334; Pl. 11, fig. 29.

Shell small, fragile, ovate-globose, pale greenish-yellow; body of the shell small, truncate at the summit; outer whorl large; aperture about twice the length of the body of the shell, and projecting above it, broadly rounded both posteriorly and anteriorly; outer lip inflexed at the middle; pillar profoundly arcuate, with a narrow delicate callus. Length, 3.10; breadth, 1.5 in. (Gould.)

TYPE in United States National Museum. Type locality, San Diego, California.

RANGE. Vancouver Island to Gulf of California.

Haminoea olgae Dall, 1919

Plate 1, fig. 11

Proceedings of the United States National Museum, **56**:300.

Shell large, thin, very light yellowish-green or reddish-brown, inflated, with the outer lip rising high above the sunken and impervious spire; the

apical depression not carinate, the axis gyrate and widely pervious; outer lip arcuate, thin, sharp, rounding into the pillar below; axial sculpture confined to low, narrow, irregular wrinkles, stronger distally; spiral sculpture of minute, close-set, slightly wavy striae over the whole surface; the inner lip with a thin coating of whitish enamel. Height, 27; diameter, 16 mm. (Dall.)

TYPE in United States National Museum, No. 216812. Type locality, Peavine Pass, Olga, Orcas Island, Washington.

RANGE. Olga, Washington, to San Quentin Bay, Lower California.

Genus **CLISTAXIS** Cossman

Some years ago Dr. Jeffreys proposed for a deep-water species the name Cryptaxis, which proved to be preoccupied by Lowe in land shells and for which Cossman substituted Clistaxis. The shell resembles *Cylichna* (= *Bullinella* Newton), but has the spire almost concealed. Jeffreys afterward referred to this genus a shell, *C. crebripunctatus,* from the Triton dredgings, which has somewhat the form of *Scaphander,* but with the spire, except the apex of the nuclear shell, concealed. Whether this form is of the same genus as the original type, *C. parvula* Jeffreys, seems doubtful, but is too complicated a question to enter upon at this time. A species related to *C. crebripunctatus,* and which appears to be undescribed, was collected by F. W. Kelsey, in 50 fathoms off the entrance to San Diego Harbor. Two specimens were obtained, showing that the animal is contained within the shell, where it had been allowed to dry. In contracting, the test was badly shattered, but showed very strong spiral rows of punctations. A much smaller specimen was better preserved and affords the following notes (Dall):

Clistaxis? polystrigma Dall, 1908

Proceedings of the United States National Museum, **34**: 246.

Shell small, white, barrel-shaped, with the posterior part of the outer lip extending slightly beyond the apex of the shell; form much as in *Haminea solitaria* Say; apex sunken, imperforate, the spire concealed; outer lip partly membranous and contracting in drying, the shell normally covered with a thin periostracum, which in drying splits and contracts; sculpture of close, numerous, spiral rows of emphatic punctations, covering the shell; aperture ample; outer lip thin and submembranous, its posterior extremity rounded over evenly to the suture, the anterior part not expanded; pillar lip thin, arcuate, the margin reflected, forming a gutter just outside the margin; body with little callus, only one whorl visible. Length of young shell, 2.8; maximum diameter, 2.2 mm. (Dall.)

TYPE in United States National Museum, No. 110649. Type locality, in 50 fathoms off entrance to San Diego Harbor, California.

RANGE. Known only from type locality.

The adult is at least three times the length above given. The soft parts do not envelop the shell. The dried animal shows through its translucency the bases of three white gizzard plates which it is impossible to extract, owing to the fragility of the shell. It is possible, however, to see that the plates are long, narrow, straight, parallel-sided, and very large for the size of the animal. The plates in *Haminea* are quite different, so that, notwithstanding the general similarity of the shells, the present species cannot be referred to the genus *Haminea*. (Dall.)

Family PHILINIDAE

Genus **PHILINE** Ascanius, 1772

Shell ovate or squarish, thin and fragile, smooth, spirally striate or punctate, or latticed, translucent, pale-colored; consisting of few loosely convoluted whorls, which are entirely open from below; spire sunken; aperture very large, broadly effuse below, the outer lip retracted joining a wide sinus above. Columella thin, arcuate. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE. *Philine aperta* Lamarck.

DISTRIBUTION. Indies, Greenland, Norway, Britain, Mediterranean, Korea, Borneo, North Pacific. Fossil: Eocine . . . .

Philine sinuata Stimpson, 1850

Shells of New England, **51**: Pl. 1, fig. 7.

P. testa minuta, ovata, alba, pellucida, longitudinaliter striata; spira conspicua; apertura antice dilatata. Long., .07; lat., .05 poll. (Stimpson.)

Shell minute, ovate, white, pellucid, longitudinally striate; spire conspicuous; aperture anteriorly dilated. Length, .07; breadth, .05 in. (Stimpson.)

TYPE in Boston Society of Natural History. Type locality, Broad Bay, Boston Harbor, in 4–7 fathoms.

RANGE. Port Clarence, Bering Strait; also Atlantic.

Philine polaris Aurivillius, 1885

Vega Expeditionens, **4**:380; Pl. 12, figs. 21, 22; Pl. 13, fig. 18.

Testa tenuissima, fragilis, pellucida, oblongo-ovata. Anfractibus 3–4 apertura ampla, ad basim expansa, supine contracta, labro externo magis

quem in *Ph. finmarchica* appresso. Superficie lineis spiralibus tenuissimus, duplicatis, catenulato inflexis obducta. Radulae formula: 1.0.1.2. uncinis lamellas laterales edentulae longitudine aequantibus. Long., 3; lat., 2.5–2 mm. (Aurivillius.)

Shell very thin, fragile, pellucid, oblong-ovate; whorls 3–4. Aperture ample, expanded at base, contracted above, the outer lip more appressed than in *P. finmarchica*. Surface covered with spiral, very delicate pairs of lines, scalloped chain-wise. (Tryon and Pilsbry, *Manual of Conchology*.)

TYPE locality, 73° 5′ N., 144° 20′ E., and 70° 28′ N., 164° 10′ E. in 8–9 fathoms.

RANGE. Arctic Sea to Nanaimo, Vancouver Island, British Columbia.

Philine bakeri Dall, 1919

Proceedings of the United States National Museum, **56**:300.

Shell minute, translucent, of two or more whorls, enfolded, except the subglobular nucleus by the last whorl; apex blunt; last whorl narrow, obliquely expanded in front; sculpture of numerous, fine, incised, punctate, spiral lines with wider interspaces; axis gyrate, pervious; aperture as long as the shell, narrow behind with a very slight sulcus, but widely expanded in front; outer lip thin, sharp, straight, inner lip hardly glazed. Height, 2; diameter, 1.25 mm. (Dall.)

TYPE in United States National Museum, No. 225194. Type locality, off South Coronado Island.

RANGE. Known only from type locality.

Family GASTROPTERIDAE

Genus **GASTROPTERON** Kosse, 1813

Shell wholly covered, consisting of a minute nautiloid, calcareous spire and a large open last whorl of very delicate membrane or cuticle. *Gastropteron* swims rapidly by means of its large parapodial lobes, which are used as wings. (Tryon and Pilsbry, *Manual of Conchology*.)

TYPE. *Gastropteron rubrum* Rafinesque.

DISTRIBUTION. Mediterranean, Unalaska.

Gastropteron pacificum Bergh, 1893

Zoologische Jahrbuch, **7**:303; Pl. 16, fig. 28.

The shell is as in *rubrum,* the calcified portion measuring .6 to .66 mm., chalk-white, radially striate, and very fragile, the large cuticular last whorl as in *G. rubrum*. (Tryon and Pilsbry, *Manual of Conchology*.)

TYPE locality, Unalaska, Aleutian Islands.

RANGE. Aleutian Islands to Fuca Strait.

Gastropteron (pacificum Bergh var.?) **cinereum** Dall, 1925

Canadian Arctic Expedition, 1913–1918, 1925.

The North Atlantic, Asiatic, and North Pacific species of *Gastropteron* are all of a reddish color sprinkled densely with darker red dots. The present species is of a uniform dusky slate color and of a smaller size than the Pacific species described by Bergh. It is an interesting addition to the sparse list of known species. The spread of the parapodia (footwings) totals 10 to 15 mm., the length of the body 8 to 11 mm. (in spirits; in the living state it was probably larger). The anterior shield is about one-third the whole length of the body. Like *G. pacificum,* it lacks a posterior flagellum on the mantle. (Dall.)

TYPE in Museum at Ottawa. Type locality, Skidegate Inlet, Queen Charlotte Islands, British Columbia.

RANGE. Queen Charlotte Islands to Vancouver Island, British Columbia.

Family AGLAJIDAE

Genus **AGLAJA** Renier, 1804

Head-shield without rhinophores or frontal process. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE. *Doridium membranaceum* Meckel.

DISTRIBUTION. Mediterranean, east coast of Africa, Australia, New Zealand, Kadiak Island, Alaska, to Catalina Island, California, Japan, Hawaiian Islands, West Indies.

Aglaja purpurea Bergh, 1894

Bulletin, Museum of Comparative Zoölogy, **25**: 209; Pl. 12, fig. 7. Tryon and Pilsbry, *Manual of Conchology,* **16**: 52; Pl. 13, fig. 78.

Living animal blackish-purple. Much contracted individual in alcohol is dark brownish, almost black in color, on the anterior shield; the hind body dirty reddish-brown; both quite finely punctate with yellow. The sides of the body as well as the lower half of the upper side of the footwings (parapodia) yellowish-brown, while the upper half of the parapodium is paler and vertically striated, as is also the hind half of the upper side of the tail. Gills dirty yellow; the hind wings of mantle quite black, finely punctate with yellow and with lighter margin. Entire under surface of animal, with the outer (under) side of the parapodia black, finely

punctured with yellow. The length, to base of posterior wings, 3.8 cm.; alt., 2.8; breadth, 3.2 cm. The length of head-shield is 2 cm., that of posterior wings 1.2 cm. Length of the contracted gill 1.5 cm. Shell without trace of calcification, horn-yellow, on anterior margin quite colorless, thin, only on the back margin a little thickened. Form as usual, the spire not solute, its continuation downward and forward not large, the last extension of the last whorl backward not long; transverse diameter of the shell about 13 mm. (Dall.)

TYPE locality, Catalina Island, California.

RANGE. Known only from type locality.

Aglaja diomedia Bergh, 1894

Bulletin, Museum of Comparative Zoölogy, **25**: 211; Pl. 11, fig. 1. Tryon and Pilsbry, *Manual of Conchology,* **16**: 52; Pl. 1, fig. 14; Pl. 15, fig. 95.

Color dark brownish-black, with sparsely strewn whitish and yellowish flecks on the back, foot, and outside of parapodia; side margins of posterior shield dirty light-yellowish; sides of body and furrow between anterior and posterior shields, bluish-gray; upper side of foot-wings and the upper side of tail grayish, the gill yellow. Color in life said to be nearly black. Form as usual. Black shield somewhat longer than the head-shield; no trace of olfactory organ discoverable. Hind wings of mantle contracted, seeming to be not much developed, not connected above, pretty rigid, with round hind end, the left one lacking a flagellum. The shell was of peculiar form, relatively larger and longer than in other species, in the largest individual 5 mm. long, 3.4 broad. It was entirely calcified, relatively thick, somewhat thinner in front, and more yellowish there, otherwise chalk-white. The spire small, not free; the process directed forward and downward large, the hollow in it adjacent to spire pretty deep. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE in United States National Museum? Type locality, Alaska.

RANGE. Shumagin and Kadiak Islands, Alaska.

Aglaja ocelligera Bergh, 1894

Bulletin, Museum of Comparative Zoölogy, **25**: 211; Pl. 11, fig. 1. Tryon and Pilsbry, *Manual of Conchology,* **16**: 53; Pl. 14, figs. 82, 83, 84.

Von dieser Form lag ein einzigas Individuum vor, bei Sitka-Harbor in Mai 1874 aus einer Tiefe von 15 Faden auf Steingrund gefischt.

Es war ziemlich zusammengezogen 12 mm. lang bei einer Höhe von 9 und einer Breite von 9. Die Farbe der Schilder so wie der Aussenseite der Fussflügel graubraun mit einer Menge von weisslichen ruden Flecken; üebereste von einer helleren Einfassung der Schilder und der Flügel

waren zu erkennen, und ebenso am Rande der Peitsche; die Unterseite des Fusses schwarzlich mit sparsam zerstreuten weisslichen Fleckchen; die Kieme gelblich . . . . Das lebende Thier soll dunkel purpurfarbig [black-purple] mit gelben Flecken gewesen sein. Die Formver haltnisse die gewöhnlichen; der Hinterrand des Vorderschildes sehr stark (3.25 mm.) vorspringend; die Hinterflügel ganz geschieden, der linke in eine 1 mm. lange Peitsche verlängert (Taf. X, fig. 10).

Die Schale an Breite (durch die Spira) 4 mm. messend, stark verkalht, alabasterärtig, nur mit einer schmalen schwach gelbichen, cuticularen Einfassung des Vorderrandes; die Spira etwas vorspringend, der Fortsatz nach vorne und unten ziemlich stark, vertieft an seinem Gründe; der rechte Theil der Schale starker, besonders mehr mach hinten (Taf. XI, fig. 5). (Bergh.)

The single individual was rather contracted. Color of shields and outside of parapodia gray-brown with a multitude of whitish round flecks. Remains of a lighter border of shields and parapodia could be distinguished, and also on margins of the flagellum. The under side of the foot blackish with sparsely-strewn whitish flecks. Gills yellowish. Living animal said to be black-purple with yellow spots. Proportions as usual. The hind margin of anterior shield very strongly produced (3¼ mm.); the posterior wings of mantle quite separated, the left lobe prolonged in a flagellum 1 mm. long. The shell is strongly calcified, alabaster-like, with only a narrow, yellowish, cuticular margin anteriorly. Spire somewhat projecting, the process running forward and downward pretty strong, deepened at its base; the right part of the shell stronger, especially more behind. Penis dirty yellow, 4–5 mm. long; glans with a strong furrow, the apex sticking out of penal opening. Prostate strong, a little longer than penis, of the same color, its end forked. Breadth, 4 mm. (Tryon and Pilsbry, *Manual of Conchology.*)

Type in United States National Museum. Type locality, Sitka Harbor, Alaska.

Range. Known only from type locality.

Described as *Doridium ocelligerum.*

Aglaja adellae Dall, 1894

Nautilus, **8:** 73. Tryon and Pilsbry, *Manual of Conchology,* **16:** 53; Pl. 9, figs. 17–22.

Animal naked, of a dark plum color, mottled with fine vermiculate spots of golden yellow; general form that of *Doridium carnosum* Cuvier, but with a shorter velum, half as long as the body and transversely truncate behind; the posterior free portion of the mantle short, obscurely

bilobed, and without a flagellum; front edge of the velum slightly excavated; parapodia wide, the sole slightly longer than the body; shell internal, subconical, white, covered with a brownish epidermis; pillar strong, reflected with a deep groove outside of it, the basal end projecting spur-like; nucleus small, depressed. (Dall.)

TYPE in United States National Museum. Type locality, Eagle Harbor, Puget Sound, in 20 fathoms.

RANGE. Known only from type locality.

Genus **NAVANAX** Pilsbry, 1895

Body elongated, similar in general character to *Aglaja,* but anterior angles of head-shield produced to form short involute rhinophores. Shell as in *Aglaja.* (Pilsbry.)

TYPE. *Navanax inermis* Cooper.

DISTRIBUTION. West America.

Navanax inermis Cooper, 1862

Proceedings of the California Academy of Sciences, 2:202. *Manual of Conchology,* **16: Pl. 15, figs. 89–93.**

Back of the body, foot, and outside of pleuropodia wine-purple, ornamented with rounded or oblong spots of yellow; inner sides of pleuropodia flesh-colored. Free edges of pleuropodial lobes and inner edges of the tail lobes and rhinophores orange-colored with adjacent band and alternating spots of blue; lower side of tail-lobes purple-blue; eye-patches white with black centers. Length, 2½; breadth of body proper, ¾ in. (living animal). Shell quite thin and completely flexible, brownish-yellow, without trace of calcification. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE in California State Collection. Type locality, San Diego Bay, California.

RANGE. Catalina Island to San Diego, California.

Family APLYSIIDAE

Genus **TETHYS** Linnaeus, 1758

Shell very thin, membranous with a thin calcareous inner layer, nearly as large as mantle, concave, with pointed, small apex, bearing a recurved lamina, and having a concave posterior sinus. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE. *Tethys leporina* Linnaeus.

DISTRIBUTION. All tropical and warm temperate seas.

SECTION NEAPLYSIA Cooper, 1863

Tethys californica Cooper, 1863

Proceedings of the California Academy of Sciences, **3**:57; fig. 14.

Shell contained in the substance of the mantle cartilaginous, translucent, trapezoidal or hatchet-shaped, margins rounded, slightly convex above, the nucleus or center in old specimens distant from the posterior end or apex. Faint radiating lines diverging from the nucleus, crossed by an irregular network of darker lines, all ending abruptly at some distance from the margin, which has thus a wide, nearly transparent border. An accessory plate arises on the inner surface from the nucleus, spatulate in form and slightly raised. (Cooper.)

This was described as *Aplysia californica* Cooper. Form and external appearance as usual in the genus. Length, 15; breadth, 5 in.; height about the same. Color pale gray or greenish, becoming purplish on the side folds of the mantle with scattered white specks from which an irregular network of brown lines extends over the rest of the body, interspersed with large brown blotches. Inner surface of mantle varied with alternating painted bars of white and dark brown interlocking together. Sole of foot black. Eyes very minute and black. (Cooper.)

TYPE in California State Collection, species 1045. Type locality, San Pedro, California.

RANGE. Monterey to San Pedro, California.

Tethys ritteri Cockerell, 1901

Nautilus, **15**:90.

Length, 21 cm.; breadth, about 8 cm. Dark grayish-olivaceous; sides with oblique, flame-like, blood-red markings, especially about the middle of the body; upper surface of the head and outer surface of epipodial lobes mottled with brown, but without any conspicuous blotches; inner surface of epipodial lobes and mantle covering shell pale sea-green, wholly without markings; lobe overlapping branchiae deep rich purple; when the shell is removed, the area beneath it is seen to be strongly suffused with dark purple; branchiae purplish-gray; sole 45 mm. broad, transversely grooved and corrugated, grayish-brown, inclining to coffee-color; epipodial lobes about 80 mm. long and 28 broad, from base within ends of lobes to nearest part of sole about 67 mm.; anterior tentacles 11 mm. from inner base to tip; posterior tentacles 14 mm. long.

Shell very thin, flexible, corneous, 58 mm. long; 42 broad; accessory plate well-developed. The animal produces an abundance of a reddish-

brown fluid. The muscular stomach or gizzard contains eleven pentagonal corneous bodies, which fit raised areas on its wall. The largest of these bodies was 14 x 10½ x 10½ mm. The alimentary canal contained seaweed. (Cockerell.)

TYPE locality, San Pedro, California.

RANGE. Known only from the type locality.

Family TYLODINIDAE

Genus **TYLODINA** Rafinesque, 1819

Corps rampant, à petite coquille dorsale exterieure, membraneuse, sans spire, ovale, a pointe calleuse, palliliforme. 4 tentacules, les 2 posterieurs eloignes et plus grands, branchies dorsales sous la coquille a droite, du cou.—*T. punctulata,* pointille de brun, tentacule obtus; coquille lisse. (Rafinesque.)

Shell limpet-like, depressed, apex-subcentral, with a minute spiral nucleus. (Woodward, *Manual of the Mollusca.*)

TYPE. *Tylodina punctulata* Rafinesque. (*Tylodina citrina* Joannis.)

DISTRIBUTION. Mediterranean, Norway, Gulf of Mexico, California. Fossil: Tertiary.

Tylodina fungina Gabb, 1865

Plate 2, figs. 20*a, b*

Proceedings of the California Academy of Sciences, 3:188. *Bulletin 112,* United States National Museum; Pl. 15, figs. 15, 16, 17.

T. testa sub-elliptica, elevata; apice sub-centrali; epidermide rufo-brunea, prope apicem lutea, ultra marginem testae projecta; intus lutea, prope marginem caerulescens. Long., 1.3; lat., 1.1; alt., .5 mm. (Gabb.)

Shell subelliptical, elevated; apex sub-central, blunt; epidermis reddish-brown, yellowish on and near the apex, projecting beyond the margin of the shell; color internally straw-yellow, shading toward the margin into a bluish white. (Gabb.)

TYPE in Survey Cabinet, Mollusca No. 994. Type locality, Santa Barbara Island, California.

RANGE. Santa Barbara Island to San Diego, California.

Family PLEUROBRANCHIDAE

Genus **PLEUROBRANCHUS** Cuvier, 1804

Shell internal, large, oblong, flexible, slightly convex, lamellar, with a posterior sub-spiral nucleus. (Tryon, *Structural and Systematic Conchology.*)

TYPE. *Pleurobranchus peronii* Cuvier.

DISTRIBUTION. South America, Norway, Britain, Mediterranean, Red Sea, Ceylon, west coast North America.

Pleurobranchus californicus Dall, 1900

Nautilus, **14**:92.

Shell rather long and narrow, subrectangular, longitudinally obsoletely striate on the left side, obscurely obsoletely punctate near the anterior edge, and covered with a very thin periostracum, which reflects nacreous tints of color. The shell itself is white and thin, with a small spiral nucleus; the left margin somewhat recurved, the central part moderately convex; the whole extends more than half the length of the body and measures 12 by 6.5 mm. (Dall.)

TYPE in Oldroyd Collection, Stanford University, No. 307. Type locality, San Pedro, California.

RANGE. San Pedro to San Diego, California.

Pleurobranchus digueti Rochebrune, 1895

Bulletin, Museum of Natural History, Paris, 240. *Manual of Conchology,* **16**; Pl. 54, figs. 98, 99, 1, 2.

Corpus rotundato ovatum, turgidum; pallio ovato, antice subtruncato, marginibus undatis, latis; pede subangusto, circulariter crenulato; regione buccali proboscidea; tentaculis duobus, rotundatis canaliculatis; branchiis subabsconditis; superne miniacum; inferne albo luteum. (Rochebrune.)

Body rounded, ovate, swollen; mantle ovate, subtruncate in front, the margins waved, wide; foot rather narrow, circularly crenulated; buccal region proboscis-like; tentacles 2, round and channeled; gills somewhat concealed; scarlet above, buff-white below. Length, 22; width, 16; alt., 12 mm. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE in Museum, Paris. Type locality, Mogote, baie de la Paz.

RANGE. San Pedro, California, to Gulf of California.

Family ELLOBIIDAE

Genus **PHYTIA** Gray, 1821

Shell oblong-oval, thin, spire acuminate; last whorl large, rounded at base; columella with an oblique plait; aperture contracted by teeth, and sometimes by a callosity of the outer lip. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE. *Alexia denticulata* Mont.

DISTRIBUTION. United States, West Indies, Madeira, Europe.

Phytia setifer Cooper, 1872

Proceedings of the California Academy of Sciences, 4:172.

Outline from ovate to lanceolate, smooth or faintly ribbed longitudinally, pale to dark purplish horn-color, often striped (by erosion of the riblets), spire acute, whorls 6–8, the last nearly three-fourths of total length, aperture about two-thirds the length, peristome thickened and slightly expanded, especially in front, the most perfect with a tubercular tooth on middle of outer wall, and less-developed ones below it, lower lip curving up to parietal wall, leaving a slight umbilical fissure behind it, and ending in a strong horizontal fold that winds like a flat tooth into the aperture; parietal wall with a flat horizontal tooth near its middle, and one or two more at regular intervals above it; thus showing five teeth in the best-developed specimens. Young with a single row of close-cut bristles revolving on an impressed line just in front of the suture; but lost in adult, though the grooves usually remain. Alt., 0.30–0.40; diam., 0.08–0.14 in. (Cooper.)

Type in California Academy of Natural Sciences. Type locality, Mission Creek, San Francisco.

Range. Humboldt Bay to San Francisco, California.

Genus **PEDIPES** Scopoli, 1777

Shell imperforate, oval-subglobose, solid, spirally striate, whorls few, the last very large; aperture much contracted by teeth; columellar lip with usually three dentiform plications, of which the posterior one is largest and spiral; outer lip sharp, callous or dentate within.

Type. *Pedipes afer* Gmelin.

Distribution. Red Sea, Mauritius, West Africa, New Caledonia, Panama, Lower California, California. Fossil: Eocene, Paris basin.

Pedipes unisulcatus Cooper, 1866

Plate 2, fig. 7

Proceedings of the California Academy of Sciences, 3; Pl. 294, fig. 29.

Shell like a *Lacuna,* obliquely ovate, the lateral outline subrhomboid, translucent, amber-brown, the spire produced, apex obtuse, whorls 4½, the third swollen, with four shallow grooves, the posterior one only much impressed, but vanishing on the last whorl; body with irregular lines of growth, undulating across the groove; numerous scattered impressed points; aperture ovate, the outer lip acute, purplish, with a double callus, within slightly tuberculate at the middle; columellar lip white, callus expanded in the plane of the aperture; its inner margin subvertical, with

two subacute teeth, the upper largest; a thin callus expanded over the inner wall, and crossing half the width of the aperture; intervals between the teeth and walls equal. Long., 0.32; lat., 0.22 unc. (equals long., 8; lat., 5 mm.). (Cooper.)

TYPE in California Academy of Sciences. Type locality, San Pedro, California.

RANGE. San Pedro, California, to Gulf of California.

Pedipes liratus Binney, 1860

Plate 2, fig. 14

Proceedings, Philadelphia Academy of Natural Sciences, 154. *Proceedings of the United States National Museum,* **8**; Pl. 18, fig. 5.

Shell imperforate, globose-conic, solid, shining, straw-colored, regularly marked with revolving ridges; spire short, depressed, apex obtuse; whorls three, the upper ones short, the lower one about equalling five-sixths the length of the shell; aperture semicircular, its parietal wall covered with shining callus, and furnished with a thick, elevated, hooked and entering fold; columella furnished with two, thick, acute, tooth-like processes, placed side by side; peristome acute, furnished on its interior with a shining callus, which is protracted into a high tubercle at its middle. Length, 3⅓; diameter, 2½; length of aperture 2½ mm. (G. W. Binney.)

TYPE in Philadelphia Academy of Sciences. Type locality, Cape San Lucas, Lower California.

RANGE. San Diego, California, to Gulf of California.

Genus **MELAMPUS** Montfort, 1810

Shell oval-conoidal, or suboval, solid; spire rather short; aperture elongated, narrow; columellar lip with several dentiform plications; columella plicate; outer lip sharp, interior with revolving ridges.

TYPE. *M. luteus* Quoy.

DISTRIBUTION. Universal, mostly tropical, salt-marsh shells. Fossil: Miocene of Touraine; Pleistocene—San Pedro, San Diego. Pliocene, San Diego well.

Melampus olivaceus Carpenter, 1856

Plate 1, fig. 16

Catalogue of the Collection of Mazatlan Shells, 178. *Proceedings of the United States National Museum,* **8**; Pl. 18, fig. 16.

Shell with green epidermis, with the irregular purplish brown tessellated patches often showing through; the sharp purplish outer lip, well-

armed with white ridges within, in the young shell, which afterward develop strong teeth at the end, and are last of all absorbed; and the thin inner lip, which develops one strong transverse parietal plate between two small denticles (others being just discernible in the young shell), and one large slanting columella fold, which winds round the base of the pillar, making an umbilical chink. A few extremely faint spiral striae are sometimes seen on the epidermis, near the base and above the bluntly-angled shoulder. Long., .65; long. spire, .11; latitude, .38 inch. (Carpenter.)

TYPE in Liverpool Collection. Type locality, Mazatlan, Mexico.

RANGE. Monterey Bay, California, to Mazatlan, Mexico.

Family GADINIIDAE

Genus **GADINIA** (Adanson) Gray, 1824

Shell depressedly-conical, surface radiated; apex subcentral, or a little posterior; aperture wide, expanded, muscular impression horseshoe-shaped, the right side shortest, terminating at the siphonal groove; siphonal groove in the front of the right side of the muscular scar.

TYPE. *Gadinia peruviana* Gray.

DISTRIBUTION. Mediterranean, Red Sea, Africa, Peru, west coast of North America. Fossil: Sicily.

The animals of this genus have very similar habits to those of the *Patellidae*. Adanson, who first observed them living on the rocks of the Island of Goree and of Cape Manuel, named them "Gadin."

Synonym *Mouretia* Sowerby, 1834. *Lyria* Gray. *Clypeus* Scacchi, not Klein. *Rowellia* Cooper, 1865.

Gadinia reticulata Sowerby, 1835

Plate 2, figs. 16*a*, *b*

Proceedings, Zoölogical Society of London, **6**. *American Journal of Conchology*, **6**: Pls. 2, 4, 1870.

T. testa supdepresso-conina, subrotundata, subterne reticulata, alba. (Sowerby.)

Shell normally almost circular; depressed conical; white or livid, sometimes tinged by the growth of a green or pink nullipore. The upper surface marked with from thirty to fifty radiating striae or riblets which are reticulated by the coarse, somewhat elevated lines of growth. The margin in young shells is denticulated, but with age this character is lost.

The interior is usually polished, except on the muscular impressions, which are granulous and strongly impressed. The scar is horseshoe-shaped, the right anterior limb broad near its extremity. Close to the anterior extremity of the left limb is a small oval scar indicating an attachment of the mantle of the shell. The apex is posteriorly curved, subcentral, smooth, and in the youngest specimens I have seen exhibits no tendency to spiral growth. In older specimens it is usually somewhat eroded. The texture of the shell is exceedingly solid, porcelainous, and strong. Old individuals fill up the cavity of the apex while adding to the margin. From the irregularities of their stations most fantastic forms occur. (Dall.)

TYPE in British Museum. Type locality, Valparaiso.

RANGE. Trinidad and the Farallon Islands to Chile.

Described as *Mouretia reticulata* by Sowerby.

Family SIPHONARIIDAE

Genus **SIPHONARIA** Sowerby, 1824

Shell ovate, above rather depressedly conical, beneath concave; vertex, when not eroded, obliquely turned backwards, exactly in the opposite direction to the canal, which is on the right side. Within, the muscular impression is observable; it is commonly very distinct, and nearly surrounding the inside at rather less than halfway from the edge to the lowest point; interrupted in front by the head of the animal, and on one side by the canal, so that between the canal and the head, there is an irregularly subcircular muscular impression only connected with that of the other side of the shell by a very narrow line, over which lies the head of the animal; the extremities of the muscular impression are rather expanded, particularly that immediately behind the canal. The canal itself sometimes forms a distinct groove within the shell, running from the vertex to the margin, and a corresponding prominence may be observed on the outside, forming a ridge from the vertex to the margin; but the internal groove and the external ridge are not always distinct; the place of the head and that of the canal can, however, be easily distinguished in all cases. (Sowerby.)

TYPE. *Siphonaria sipho* Sowerby.

DISTRIBUTION. Cape, India, Philippines, Australia, New Zealand, Pacific, Galapagos, Peru, Cape Horn, California. Fossil: Miocene . . . .

Subgenus LIRIOLA Dall, 1870

Siphonaria thersites Carpenter, 1864

Annals and Magazine of Natural History, **14**:425. *American Journal of Conchology,* **6**: Pl. 4, fig. 8; Pl. 5, fig. 2, 1870.

S. testa parva, tenui, haud elevata, valde inaequilaterali, dense nigrocastanea, laevi, seu interdum costulis paucis, obtusis, obsoletis, radiatim vix ornata; epidermide laevi, tenui, fugaci; costa pulmonali intus et extus valde conspicua, tumente; vertice obtuso, plerumque ad quadrantem, interdum ad trientem totius longitudinis sito; intus intense nigro-fusco, margine acuto. Long., .16; lat., .33; alt., .17. (Carpenter.)

Shell small, subconical, apex to one side, epidermis thin, light-colored, smooth, exterior of shell dark reddish-brown; with a few ribs; siphonal mark is quite perceptible, the siphonal groove forms an extension of the edge of the shell. Aperture elongate oval. Color of interior is a dark brown, with a light border around the margin. (Oldroyd.)

TYPE in United States National Museum. Type locality, Neah Bay, Washington.

RANGE. Aleutian Islands to the Straits of Juan de Fuca.

Subgenus KERGUELENIA Rochebrune and Mabille, 1889

Siphonaria brannani Stearns, 1872

Plate 2, fig. 18

Proceedings of the California Academy of Sciences, **4**:249; Pl. 1, fig. 4. *Bulletin 112,* United States National Museum; Pl. 15, figs. 13, 14.

Shell oval, subconical, helcion-shaped; apex recurved and somewhat twisted, anterior and sometimes quite in line with margin; surface of shell irregularly undulating, of a dark brownish color, and marked with numerous fine whitish radiating ribs which crenulate the margin; shell internally shining and dark chocolate brown; muscular impression and siphonal groove distinct. Some specimens are quite irregular in outline, being affected in that respect by the inequalities of the surface upon which they are found. Long., .29; lat., .30 in. (R. E. C. Stearns.)

TYPE in United States National Museum. Type locality, Santa Barbara, California.

RANGE. Santa Barbara and Catalina Island to Laguna Beach, California.

Genus **WILLIAMIA** Monterosato, 1884

Shell small, thin, apex recurved, and more or less acutely pointed, surface smooth, without sculpture. Siphonal groove is not visible from the outside, without emargination. The hooked recurved apex separates this genus from *Siphonaria.* (Oldroyd.)

DISTRIBUTION. California to Gulf of California.

Williamia vernalis Dall, 1870

Plate 2, figs. 19*a, b*

American Journal of Conchology, 6:37; Pl. 4, figs. 11 *a–b.*

Shell small, thin conical; apex recurved, nearly in the median line, more or less acutely pointed; generally somewhat eroded in old specimens. Epidermis thin, not polished, smooth, brownish-red on the apex and in dead shells; in fresh or young individuals of a bright grass-green, somewhat wrinkled and frequently overlapping the border of the shell; fugacious. Shell smooth, reddish-brown, with fifteen or more light yellow-green rays of color, radiating from the spire. There are no ribs or costae, but occasionally a moderately sharp line or two may be observed radiating from the apex, and impressed, as it were, from below. The apex is lighter than the rest of the shell. The interior is extremely polished and brilliant, and only in dead specimens is the mark of the siphon perceptible without a glass. The external colors are visible within the translucency of the shell. The siphonal groove is not visible from the outside, nor does it cause any extension or emargination of the edge of the shell. The aperture is roundly oval and the edge is simple. Long., .48; lat., .36; alt., .23 in. (Dall.)

TYPE in United States National Museum. Type locality, Monterey, Calif.

RANGE. Crescent City to San Nicolas Island and La Jolla, California.

Williamia peltoides Carpenter, 1864

Plate 2, fig. 17

Annals and Magazine of Natural History, 13:474. *Bulletin 112,* United States National Museum; Pl. 15, figs. 10 and 12.

N. testa parva, laevi, cornea, subdiaphana, ancyliform, apice elevato, valde inaequilaterali, strigis pallide castaneis radiata; intus nitidissima, subaurantia. Long., .14; lat., .11; alt., .05 poll. (Carpenter.)

TYPE in Liverpool Collection. Type locality, Cape San Lucas, Lower California.

RANGE. Monterey to Catalina Island, to Gulf of California. This is the *Nacella, Mazatlan Catalogue,* No. 263, page 203.

Tablet 944 contains a solitary specimen of a *Nacella,* of the shape and size of *Ancylus fluviatilis,* with the apex spirally recurved, and of a dark, horny color. It is not perfect enough for description. (Carpenter.)

Family ONCHIDIIDAE

Genus **ARCTONCHIS** Dall, 1905

Species small, like *Onchidella,* but without muciparous glands on the lower side of the mantle, without dorsal eyes and with a jaw. (Dall.)

TYPE. *Onchidella borealis* Dall.

DISTRIBUTION. Cool temperate and boreal coasts.

Arctonchis borealis Dall, 1871

American Journal of Conchology, 7:135. *Proceedings,* Philadelphia Academy of Natural Sciences, 1876; Pl. 6, fig. E.

Animal small, black, with dots and streaks of yellowish-white, foot light-colored, also muzzle and tentacles. Back regularly rounded, but a little pointed in the middle; smooth or very finely granulose, tough and coriaceous. Eyes globular, blue, on very short constricted tentacles. Muzzle short, rounded-transverse. Head not produced beyond the anterior edge of the mantle. Sexual appendages on the right side, near the head. Foot ovate, narrow, rather roundly pointed behind. Long., .3 inch. (Dall.)

TYPE in United States National Museum. Type locality, Sitka, Alaska, on rocks near tide marks, especially on the small islets in the Bay.

RANGE. Port Moller and Aleutian Islands to northern California.

Described as *Onchidella borealis* Dall.

Family TEREBRIDAE

Genus **TEREBRA** (Bruguiere, 1789) Lamarck, 1799

Subgenus STRIOTEREBRUM Sacco, 1891

Shell with uniform sculpture, relatively small, acute, a strongly marked presutural sulcus and band, whorls flattish with axial ribs and spiral sculpture, short canal or none, usually two keels on the pillar; the body is destitute of callus and without a raised pillar lip. (Dall.)

TYPE. *Terebra maculata* Lamarck.

DISTRIBUTION. Mostly tropical; East Indies, west and east coast of America. Fossil: Eocene . . . .

Terebra pedroana Dall, 1908

Plate 6, fig. 6

Bulletin, Museum of Comparative Zoölogy, **43**: No. 6, 251.

Shell small, slender, acute, apex (slightly decollate); subsequent whorls flattened, about eleven in number, the sutural band, on the early

whorls, axially undulate by the prolongations of the ribs across the feeble sulcus to the suture; axial sculpture of numerous, nearly vertical, low, narrow riblets with wider interspaces, proportionately less marked on the last whorl; these are crossed without modulation by three, obscure, flattish, spiral bands, with one or two narrower and more thread-like, and on the base of the last whorl six or seven more feeble spirals of the same sort, all with narrower, feebly channeled interspaces; aperture narrow behind a thin callus and anterior keel on the pillar; outer lip thin, sharp; canal very short, recurved, bordered by a prominent sharp keel on the posterior edge of the siphonal fasciole, hardly visible on the pillar but perceptible within the whorls; color bluish-white with irregular blotches of yellowish-brown, or all brownish. Long. of (decollate) shell, 32; of last whorl, 12; of aperture, 8; max. diam., 6.5 mm. (Dall.)

TYPE in United States National Museum, Nos. 118806 and 32772. Type locality, San Pedro, California.

RANGE. San Pedro to San Diego, California.

Terebra pedroana philippiana Dall, 1920

Annals and Magazine of Natural History, ser. 3, **15**:395.

M. testa rufo-cinerea, minore, minus terti, epidermide tenui; anfr. xii., planatis; fascia suturali valida, nodosa, tuberculis ovalibus crebris validioribus (anfr. penult. circa xv.) ornata; testa adolescente costulis radiantibus, postea evanescentibus; striolis antice et postice spiralibus, circa peripheriam saepe obsoletis; basi rotundata; canali brevissimo, alte emarginato; carina supra canalem acuta, columellam plicate; labro acuto, vix undato. (Carpenter.)

TYPE in British Museum. Type locality, Santa Barbara, California.

RANGE. Santa Barbara, California, to head of Gulf of California.

This is *Terebra simplex* Carpenter, 1865, not of Conrad, 1830.

Family CONIDAE

Genus **CONUS** Linnaeus, 1758

Testa univalvis, convuluta, turbinata. Apertura effusa, longitudinalis, linearis, edentula, basi integra, columella laevis. (Linnaeus.)

Shell thick, obconic, whorls enrolled upon themselves, the spire short, or not elevated, smooth or tuberculated; aperture elongated, narrow, the margins parallel, truncated at the base; the outer lip with a slight sutural sinus. (Tryon, *Structural and Systematic Conchology.*)

TYPE. *Conus marmoreus* Linnaeus.

DISTRIBUTION. All tropical seas, one species on the California coast. Fossil: Chalk to Pleistocene—Britain, France, India, Java, Pacific.

Conus californicus Hinds, 1844

Zoölogy of the Voyage of H. M. S. Sulphur, Mollusca, 6; Pl. 1, figs. 3–6.

Testa encoronata, subfusiformi, involute, laevi, pallida vel ferruginea, lineisrufa regulariter induta, maculis parvis lacteis conspersa; spira conica, elata; labio subarcuato, acuta; epidermide castanea velutina. (Hinds.)

A somewhat small species, when clothed in its velvety epidermis reminding one strongly of a large filbert, and when this is removed displaying a pale iron-rust colored surface, traversed at equal distances by numerous reddish lines and with small milk-white spots occasionally scattered about in irregular clusters. (Hinds.)

TYPE locality, Magdalena Bay, Lower California.

RANGE. Farallon Islands, California, to Magdalena Bay, Lower California.

Family TURRITIDAE (Pleurotomidae)

Genus **CRYPTOCONUS** von Koenen, 1867 (Surcula)

Shell biconical; spire elevated; aperture narrow, with borders subparallel; the columella border furnished on the posterior part with one or two foldlike ridges. Lip arcuate; labial sinus wide and deep. (Translation.)

TYPE. *Pleurotoma filosa* Lamarck.

Cryptoconus tryonianus Gabb, 1866

Paleontology of San Pedro, California, 2:6; Pl. 1, fig. 9.

Shell large, fusiform; spire about as long as the mouth; whorls about seven or eight, angulated in the middle, sloping concavely above, and very slightly convex below. Surface ornamented by a row of nodes on the angle of the whorl, and by numerous fine revolving ribs. Aperture narrow; inner lip slightly sinuous and incrusted; posterior sinus of outer lip broad and shallow; canal moderate, nearly straight. Length, 95; height, 35 mm.

TYPE in University of California. Type locality, Post-Pliocene of San Pedro, California.

RANGE. San Pedro, California, to Todos Santos Bay, Lower California. Fossil: Pleistocene—Santa Barbara, San Pedro.

Cryptoconus tremperianus Dall, 1911

Plate 11, fig. 12

Nautilus, **24:** 109. *Bulletin 112,* United States National Museum; Pl. 12, fig. 5.

Shell small, in the adult stage averaging about 62 mm. in length. It is much heavier, the anal fasciole is more strongly constricted, and the appressed margin of the whorl does not approach as closely to the periphery of the preceding whorl as in *carpenteriana.* The periphery is often marked by a minutely beaded or undulate thread, and is more nearly midway between the sutures on the spire than in *carpenteriana.* Aperture, 32.1; spire, 32.2; diameter, 20.7 mm. (Dall.)

TYPE in United States National Museum. Type locality, off San Pedro, California.

RANGE. Point Ano Nuevo, California, to Cerros Island, Lower California.

Cryptoconus stearnsianus Raymond, 1904

Nautilus, **18**:1.

Shell broadly fusiform, spire acute, outline of spire moderately convex; whorls eight and one-half, convex anteriorly, slightly concave near the suture, the margin at the suture strongly appressed; suture distinct; aperture longer than the spire; color orange to cream, a broad, spiral, brown band below the suture and nine or ten, narrow, clearly-defined bands on the last whorl, one or two of these also visible on the spire, bands nearly as wide as the lighter interspaces; interior of the aperture yellowish, lighter within and spotted with brown on the outer lip by external bands; first two whorls smooth, later whorls with numerous revolving threads, closely beaded at the spire by incremental lines which follow the outline of the lip, threads not beaded below the periphery of the last whorl, but roughened by the growth-lines and somewhat coarser anteriorly; aperture rather narrow; posterior sinus shallow, rounded; lip acute, produced below the sinus, canal wide; pillar solid, somewhat curved, obliquely truncated below. Long. of shell, 30; of aperture and canal, 17; of body-whorl, 33; maximum diameter, 13 mm. (Raymond.)

TYPE in University of California Collection. Type locality, off San Diego, California.

RANGE. Monterey to San Diego, California.

Cryptoconus carpenterianus Gabb, 1865

Proceedings of the California Academy of Sciences, 3:183. *Paleontology of San Pedro, California,* 2: Pl. 1, fig. 8.

P. t. fusiformis; anfractibus viii, prope suturam concavis; tota superficie confertim et spiralitur costulata; colore aurantiaco, lineis rufo-brunneis interruptis induta; apertura angusta; sinu posticolato; haud profundo. Long., 2; lat., 7; long. aper., 1.1 in. (Gabb.)

Fusiform, spire high, acute, whorls eight, slightly concave near the suture, convex below. Surface marked by numerous rounded revolving ribs, sometimes alternating in size, especially on the lower part of the body whorl. Color orange with broken revolving bands of a bright reddish-brown; these lines or bands usually occupy the larger ribs, and are more distant on the middle of the whorl and more closely placed above and below; they average about a tenth of an inch apart. Aperture narrow, growing proportionally broader in older shells; canal moderate, slightly twisted, inner lip lightly incrusted; outer lip acute, sinus broad and shallow. (Gabb.)

TYPE in California Geological Survey, Nos. 819 and 1021. Type locality, Post-Pliocene—Santa Barbara, California.

RANGE. Bodega Bay to San Pedro, California. Fossil: Pleistocene—Santa Barbara, San Pedro, San Diego, and Ventura, California; Pliocene—Santa Rosa, San Fernando, San Diego (well), California.

Genus **AFORIA** Dall, 1889 (Pleurotoma)

This group has the shell of a typical *Pleurotoma,* but has no operculum; the typical species reaches three or four inches in length, is strongly carinated above the periphery, and the wide rather deep anal sulcus is nearer to the carina than to the suture. (Dall.)

TYPE. *Pleurotoma circinata* Dall.

Aforia circinata Dall, 1873

Plate 4, fig. 1

Proceedings of the California Academy of Sciences, 5:61; Pl. 2, fig. 5.

Shell slender, elongate, covered with a brownish epidermis; whorls six, with a single, sharp, narrow carina, about the middle of the whorl, in the upper whorls; this carina does not interrupt the even rotundity of the whorls so as to produce any flattening of the latter, but appears as if it had been placed upon the equator of the whorl, after the latter had been completed. The posterior surface of the carina and that part of the whorls behind it, are destitute of any but the most microscopic revolving

striae, though plainly marked by the deeply notched lines of growth. The anterior surface of the carina and whorls is covered with sharp, revolving grooves, with wider interspaces, being about twelve on the body whorl, between the posterior edge of the aperture and the carina. The notch is deep, and about one-third of the way from the carina to the suture. Aperture and canal long and narrow; outer lips, before the carina, effuse. Nucleus white. Long., 3; lat., 1 in. (Dall.)

TYPE in United States National Museum. Type locality, Nateekin Bay, Captain's Bay, Unalaska.

RANGE. Bering Sea to Straits of Juan de Fuca.

Genus **LEUCOSYRINX** Dall, 1889

Shell moderately large, thin, white, or pale, with impervious axis, the sculpture chiefly of delicate spiral threading with feeble axial riblets at the shoulder; anal fasciole wide, shallow, next the suture; canal moderately long, distally flaring; the pillar thick, anteriorly obliquely truncate; operculum subovate, acute in front, with a medial thickened rib on the inner face, the area of attachment small, the nucleus apical. (Dall.)

TYPE. *Pleurotoma verrilli* Dall.

Leucosyrinx kincaidi Dall, 1919

Plate 6, fig. 2

Proceedings of the United States National Museum, **56**:6; Pl. 2, fig. 8.

Shell of moderate size, fusiform, with an acute spire and elongated canal waxen white, nucleus of two smooth bulbous whorls with five subsequent whorls; axial sculpture only of faint incremental lines; spiral sculpture including a very prominent, thin, sharp, peripheral keel and fine spiral striae with wider interspaces, over most of the surface; the interspaces become more rounded and coarse on the base; the entire space between the keel and the preceding suture may be said to form the anal fasciole, the wide arcuate sulcus being situated a little way in front of the suture; the base is neatly rounded and contracted at the beginning of the canal; outer lip thin, sharp, much produced in front, inner lip slightly erased; pillar obliquely attenuated in front, gyrate, and with a minutely pervious axis; canal narrow, slender; operculum yellowish, ovate, with an apical nucleus. Height of shell, 29; of last whorl, 21.5; diameter, 13 mm. (Dall.)

TYPE in United States National Museum, No. 151581. Type locality, Shelikoff Strait, north of Kodiak Island, Alaska.

RANGE. Known only from type locality.

Leucosyrinx amycus Dall, 1919

Plate 3, fig. 7

Proceedings of the United States National Museum, **56**:5; Pl. 3, fig. 7.

Shell white with an ashy-brown periostracum and six or more whorls, the apex eroded; suture slightly appressed, especially on the spire; anal fasciole wide and deep, somewhat in front of the suture and extending to a moderate peripheral carina; behind the carina the shell is feebly, and in front of it strongly spirally grooved with wider flat interspaces; aperture simple, outer lip thin, produced, inner lip erased, white, pillar gyrate but not pervious, canal distinct and slightly recurved. Height of shell, 52; of last whorl, 40; diameter, 20 mm. (Dall.)

TYPE in United States National Museum, No. 204049. Type locality, off Monterey Bay, California.

RANGE. Known only from type locality.

Leucosyrinx persimilis Dall, 1908

Bulletin, Museum of Comparative Zoölogy, **43**: No. 6, 271; Pl. 12, fig. 2.

Shell large, white, fusiform, with a pale olive periostracum, acute spire, and eight whorls, exclusive of the (lost) nucleus, each carrying a peripheral keel; suture distinct; whorls behind the periphery somewhat flattened, with a shallow constriction just behind the keel; axial sculpture only of incremental lines; spiral sculpture between the suture and periphery of numerous flat, subequal, strap-like bands separated by narrower, shallow channels; periphery with a low, rather wide prominence, giving the effect of a keel and sculptured with several similar but larger, stronger, and more distant bands, tending to arrange themselves in pairs, and with a fine, subsidiary spiral striation upon them; this sculpture extends over the anterior half of the whorl, becoming finer and closer on the canal; aperture elongate; outer lip thin, sharp; a wide, deep, anal sulcus on the posterior slope of the whorl about midway between the suture and the periphery; anterior part of the lip arcuate, protractive; body with the sculpture erased, white, polished; pillar short, twisted in front obliquely truncate and gyrate, but not axially pervious; a touch of brown on the edge; canal wide, elongate, slightly recurved, with no fasciole: Long. of shell, 95; of last whorl, 70; of aperture, 55; maximum diameter, of shell, 32; of canal, 7 mm. Operculum brown, oval, the exterior imbricately lamellose, the nucleus inside the apical end which is bluntly rounded. (Dall.)

TYPE in United States National Museum, No. 123101. Type locality, U.S.S. "Albatross" Station 3393, Gulf of Panama, in 1,020 fathoms.

RANGE. Abyssal, eastern Pacific.

Leucosyrinx persimilis blanca Dall, 1919

Proceedings of the United States National Museum, **56**:5.

Shell differing from the original *persimilis* by the well-marked spiral sculpture being continuous over the whole surface and by the pronounced depressed spiral area on each side of the convex anal fasciole, which with the ridge at the shoulder gives the effect of two parallel ridges behind the periphery. Height of shell, 60; of last whorl, 44; diameter, 22 mm. (Dall.)

TYPE in United States National Museum, No. 214337. Type locality, off Cape Blanco, Oregon, in 1,064 fathoms.

RANGE. Known only from the type locality.

Leucosyrinx persimilis leonis Dall, 1908

Bulletin, Museum of Comparative Zoölogy, **43**:272.

Shell small compared with the typical species, white, of about seven evenly rounded whorls. Compared with young of *L. persimilis* of the same size the whorls are more capacious, smoother, not flattened behind nor on the periphery; the carinations of *persimilis* are wanting or expressed only by an obsolete indication of a ridge; the canal is wider and more recurved, the anal fasciole shows the markings of the sulcus to be wider and not quite so near the suture. Long. of shell, 50; of last whorl, 38; of aperture, 29; maximum diameter, 18 mm. (Dall.)

TYPE in United States National Museum, No. 110605. Type locality, U.S.S. "Albatross" Station, off Sea Lion Rock, coast of Washington.

RANGE. Off Sea Lion Rock, Washington, to Cortez Bank, California, in deep water.

Genus **IRENOSYRINX** Dall, 1886

Shell large, thin, fusiform, white, with a keel at the shoulder; sculpture feeble, wholly spiral; anal sulcus wide, shallow, nearer the shoulder than the suture; axis pervious, aperture and canal longer than the spire; outer lip produced, thin, simple; canal elongate, pillar obliquely truncate; operculum in the young paucispiral, later the paucispiral nucleus is surrounded by concentric additions, leaving the nucleus subcentral, or a

little anterior and to the right, in an elliptical concentric operculum without internal rib, with a large area of adhesion, and an outline in general like the operculum of *Buccinum.* (Dall.)

TYPE. *Pleurotoma goodei* Dall.

DISTRIBUTION. Arctic.

Irenosyrinx pacifica Dall, 1908

Bulletin, Museum of Comparative Zoölogy, 43:270; Pl. 12, fig. 3.

Shell small, delicate, white with a pale yellowish periostracum, with at least six whorls beside the (lost) nucleus; spire acute, slender, longer than the aperture; suture deep, appressed; whorls gently rounded; apical whorls with (on the third about fifteen) very narrow, sharp, threadlike, vertical ribs with much wider interspaces, and at the suture numerous, irregular, small, retractive folds extending over the fasciole, with wider interspaces, nearly twice as many as there are ribs; on the succeeding whorls these ribs and folds grow sparser and weaker, so that on the sixth whorl ribs, folds, and fasciole are obsolete or absent; on the spire, the axial sculpture is crossed by (on the third whorl about eight, on the sixth ten or a dozen) fine flat threads with wider interspaces (increasing in interpolation), which override the ribs and rise above them but do not form nodules at the intersections; these spirals are very uniform, and on the last whorl extend forward covering the canal, and are slightly scored by the incremental lines; aperture oval, not mature in the specimen, the anal sulcus obsolete; pillar and body polished, the surface erased, not callous; the pillar is short, gyrate, the axis pervious, but the canal is short, rather wide, with no siphonal fasciole; the outer lip only slightly produced, sharp and thin in the type specimen. Operculum concentric, pointed in front, with an apical nucleus. Long. of (decollate) shell, 23; of last whorl, 15; of aperture, 10.5; maximum diameter, 7 mm. (Dall.)

TYPE in United States National Museum, No. 122590. Type locality, U.S.S. "Albatross" Station 2859, in the Pacific Ocean.

RANGE. Southwest of Sitka, Alaska, in 1,569 fathoms.

Irenosyrinx crebristriata Dall, 1908

Plate 6, fig. 9

Bulletin, Museum of Comparative Zoölogy, 43:272; Pl. 13, fig. 10.

Shell of moderate size, white, covered with a pale periostracum; spire acute, a little shorter than the aperture; whorls rounded, six in number exclusive of the (lost) nucleus; suture very distinct; axial sculpture none,

except incremental lines, unless on the (eroded) apical whorls; siphonal fasciole wide, extending from the suture to an obscure ridge which forms the shoulder of the whorl just behind the periphery; on the fasciole are six or seven smooth, rounded, subequal, spiral threads with equal or wider interspaces, more crowded anteriorly; beyond the shoulder are nine similar but coarser threads, sometimes entire, sometimes flattened or even medially sulcate on top, extending over the base, and on the region of the canal as many more, smaller and more distant, crossed by obvious incremental lines; aperture elongate, rather narrow, anal sulcus very wide but shallow; outer lip produced, evenly arcuate to the canal, not constricted at the base of the whorl; pillar lip smooth, pillar short, obliquely truncate, gyrate, the axis pervious; canal wide, hardly differentiated. Long. of shell, 48; of last whorl, 35; of aperture, 26; maximum diameter, 16.5 mm. (Dall.)

TYPE in United States National Museum, No. 122563. Type locality, U.S.S. "Albatross" Station 2859, Pacific Ocean, in 1,569 fathoms.

RANGE. Known only from type locality.

Genus **CYMATOSYRINX** Dall, 1889 (Drillia)

We now come to a group of *Drillias* which have a family resemblance to *Pleurotoma lunata* Lea, of the Miocene of Virginia, and are doubtless derived from the same stock. That species of which the type is before me as I write, is larger, stouter, and finer in development than any of its recent relatives, but there is a singularly uniform facies to them all. *D. pallida* Sowerby, from the west coast of America at Panama, is apparently to be included in the same group. For these, should a sectional name be required, since they are distinctly not typical species of *Crassispira,* the name *Cymatosyrinx* might be applied. (Dall.)

TYPE. *Pleurotoma lunata* Lea.

DISTRIBUTION. Pacific coast of America. Fossil: Miocene of the Atlantic.

Subgenus ELAEOCYMA Dall, 1917

Cymatosyrinx empyrosia Dall, 1899

See Part III, Plate 4, fig. 5

Nautilus, **12**:127. *Proceedings of the United States National Museum,* **56**: Pl. 4, fig. 1.

Shell solid, with a high acute spire and polished surface; color yellowish with a burnt sienna brown tint on the later whorls, a paler peripheral band develops white patches where it crosses the ribs; transverse sculpture

of (about 11) slightly oblique somewhat flexuous ribs, obsolete below the periphery and upon the anal fasciole, sharpest on the earlier whorls. Spiral sculpture of coarse, sometimes nearly obsolete threads, most obvious below the periphery; whorls nine, the nucleus lost in the specimen; aperture short, wide, with a deep wide notch leaving a wide fasciole, a callous lump above the notch on the body, and a rather strong whitish callus, externally brown-edged, on the pillar; siphonal notch wide with a marked fasciole, the canal slightly recurved. Long. of shell, 31; of last whorl, 16; of aperture, 10; max. diam., 10 mm. (Dall.)

TYPE in Oldroyd Collection, Stanford University, No. 434. Type locality, off San Pedro, California, in deep water.

RANGE. San Pedro to San Diego, California.

Cymatosyrinx hemphilli Stearns, 1871

Proceedings of the California Academy of Sciences, **5**:80; Pl. 1, fig. 3.

Shell small, smooth, slender, polished; spire long, subacute, rounded at apex; longitudinally marked with inconspicuous, oblique ribs, which are nearly obsolete on the body whorl; number of whorls seven, with well-defined sutural and just below it a parallel impressed thread-like line; shell of an opaque dingy horn color; incremental lines fine, marked in some specimens with dingy white; mouth obliquely ovate, about one-third the length of the shell; labrum produced, anteriorly somewhat thickened; sinus sutural, deep calloused; columella thickened at base; canal very short, somewhat produced and twisted; one specimen shows obscure, revolving, impressed lines below the swell of the body whorl; size quite uniform. Long., .26; lat., .09 in. (Stearns.)

TYPE in United States National Museum. Type locality, Todos Santos Bay, Lower California.

RANGE. Santa Barbara, California, to Gulf of California.

Cymatosyrinx halocydne Dall, 1919

Plate 19, fig. 5

Proceedings of the United States National Museum, **56**:11; Pl. 4, fig. 4.

Shell slender, acute, rather flat-sided, purplish-brown usually more or less obscured by a yellowish-white glaze; nucleus with the first turn smooth, inflated, the second has a peripheral keel and is followed by about eight and a half subsequent whorls; suture strongly appressed with a smooth, narrow band in front of it and behind the somewhat constricted fasciole; other spiral sculpture of sharply incised lines, four or five on the spire between the sutures, equal and with wider equal-rounded interspaces,

and about 24 on the last whorl, the interspaces becoming more cord-like near the canal and sometimes feebly nodulous where the lines cut the ribs; axial sculpture of (on the penultimate whorl about 18) feeble narrow ribs, stronger near the apex, obsolete on the last whorl, with wider interspaces, beginning in front of the fasciole, hardly reaching the base, and protractively oblique; there are also fine sharp incremental lines chiefly evident in the depressions, but here and there finely reticulating the interspaces; aperture rather wide, anal sulcus conspicuous, rounded; outer lip thin, prominently arcuate, smooth within; inner lip with a thin layer of brownish enamel, the edge raised anteriorly; canal distinct, slightly constricted, with a small concentrically siphonal fasciole. Height of shell, 18; of last whorl, 10; diameter, 6 mm. (Dall.)

TYPE in United States National Museum, No. 216748. Type locality, Station 203, off San Pedro.

RANGE. San Pedro and the Santa Barbara Islands, California.

Genus **CLATHRODRILLIA** Dall, 1918 (Drillia)

For the generally brown or brownish clathrate species, a few of which are found in nearly every fauna, and of which *Pleurotoma gibbosa* Reeve may be specified as a typical example, the new name of *Clathrodrillia* Dall may be used. (Dall.)

TYPE. *Pleurotoma gibbosa* Reeve.

DISTRIBUTION, on west coast, Bering Strait to San Pedro, California.

Clathrodrillia renaudi Arnold, 1903

Paleontology of San Pedro, 208; Pl. 8, fig. 5.

Shell small, fusiform, turreted; apex blunt; whorls eight, sharply angular, with angle about two-fifths distance from anterior margin of whorl; upper and lower surface flat, about fifteen oblique nodes ornament the angle and extend down on the lower portion of the whorl, becoming obsolete before reaching the suture; nodes obsolete on body-whorl; suture deeply impressed, distinct; aperture short, elliptical, oblique; posterior sinus shallow; anterior sinus long, straight; columella incrusted within; body-whorl angular, ventricose, much produced and narrow below, smooth, except for very faint incremental lines. Long., 15.8; lat., 6; body-whorl, 9; aperture, including canal, 7 mm. (Arnold.)

TYPE in United States National Museum. Type locality, Pliocene of San Pedro, California.

RANGE. Known only from type locality, recent and fossil.

Subgenus Suavodrillia Dall, 1918

Clathrodrillia kennicottii Dall, 1871

Plate 6, fig. 5

American Journal of Conchology, 7:102; Pl. 16, fig. 2.

Shell solid, acuminate, white, with traces of a thin yellowish epidermis. Columella twisted, canal slightly recurved; inner lip with a thin white callus; outer lip strongly flexuous, deeply excavated below the suture, exceedingly effuse anteriorly, thin and sharp. Nucleus smooth, white, small, obliquely bent. Sculpture of the upper whorls consisting of a very strong, broad, rounded carina, a little below the middle of the whorl, flattened on top, with a faint revolving ridge on each side of it, the lower one just above the suture, which is appressed. The whorls are quite flat except for the ridges and carina, and marked by strong oblique lines of growth. Last whorl flat above the carina and rounded below it. The ridge below the carina becomes almost as large as the latter, which is less prominent than upon the upper whorls. Below the ridge alluded to are others gradually diminishing in size anteriorly to the number of eight or ten, of which only two or three are at all prominent. Length, 0.84; lat., 0.36 mm. (Dall.)

Type in United States National Museum. Type locality, North Harbor, Unga Island.

Range. Bering Strait to Aleutian Islands.

Clathrodrillia willetti Dall, 1919

Proceedings of the United States National Museum, 56:29.

Shell small, white, with a pale operculum with apical nucleus; nuclear whorls translucent white, glassy, inflated, about one and a half in number then gradually passing into the reticulate sculpture of the five or six subsequent turns; suture appressed with one or two close-set prominent spiral threads in front of it; whorls sloping forward from these threads to an angle at the shoulder forming the periphery, this part of the whorl minutely spirally threaded; other spiral sculpture of (on the base about five) strong threads with wider interspaces containing minor threads all merging toward and on the canal into a series of subequal close-set threads; the anal fasciole has its deepest part at the shoulder angle, but the arcuate incremental lines on the whorl behind the angle indicate that it was when complete wide and shallow; axial sculpture of (on the penultimate whorl about 16) strongly protractive short ribs starting at

the shoulder, which they slightly nodulate, and reaching to the suture, but obsolete on the last whorl and not reaching much beyond the periphery; outer lip thin, sharp; inner lip erased; pillar short, obliquely attenuated in front; canal short, distinct, slightly recurved. Height of shell, 10; of last whorl, 5; diameter, 4.5 mm. (Dall.)

TYPE in United States National Museum, No. 216409. Type locality, Forrester Island, Alaska.

RANGE. Known only from type locality.

Subgenus MONILIOPSIS Conrad, 1865

Clathrodrillia grippi Dall, 1919

Plate 11, fig. 15

Proceedings of the United States National Museum, **56**:27; Pl. 8, fig. 2.

Shell slender with about eight (slightly decollate) whorls, livid olivaceous with a pale peripheral band, lighter near the aperture; suture appressed, on the upper whorls rudely nodulose; spiral sculpture in front of the fasciole on the spire of five or six strong cords with narrower interspaces overriding the ribs; the cords cover the last whorl, feebler on the periphery, coarser on the base; there are also faint spiral striae here and there; axial sculpture on the upper part of the spire; 14 or 15 strong rounded ribs with wider interspaces, feebler on the penultimate, obsolete on the last whorl; aperture ovate, anal sulcus conspicuous, shallow; outer lip thin, simple; inner lip smooth; canal short, wide, not recurved. Height of shell, 27; of last whorl, 16; diameter, 10 mm. (Dall.)

TYPE in United States National Museum, No. 203670. Type locality, San Diego, California.

RANGE. Known only from the type locality.

Clathrodrillia incisa Carpenter, 1865

Plate 18, fig. 3

Proceedings, Philadelphia Academy of Natural Sciences, 62. *Proceedings of the United States National Museum,* **56**; Pl. 12, fig. 7.

D. t. "D. inermi" forma et indole simili; sed cinerea, rufofusco copiose spiraliter lineata; anfr. nucleosis majoribus, subplanatis; anfr. normalibus vii. subplanatis spiraliter subobsolete coelatis; sulci in spira circiter viii., quarum quarta radiatim sinuata; canali quoad genus longiore, aperta; columella arcuata; labio distincto; labro tenui, parum sinuato; epidermide

subfugaci, laminis incrementi subrugosa; operculo pyriformi, haud angulato, apice antico. Long., 1.13; long. spir., 0.65; lat., 04. (Carpenter.)

Shell in general form like *C. ophiderma,* but smaller, the whorls somewhat more rounded; cinerous, with reddish chestnut revolving lines. (Tryon and Pilsbry, *Manual of Conchology.*)

Spiral sculpture grooved, not raised. (Carpenter.)

TYPE in? Type locality, Puget Sound.

RANGE. Puget Sound to San Pedro, California. Fossil: Pleistocene—Santa Barbara, San Pedro, San Diego.

Described as *Drillia incisa* Carpenter, 1856, not *Pleurotoma incisa* Reeve, 1843.

Clathrodrillia incisa ophioderma Dall, 1908

Proceedings of the United States National Museum, **34**:247. Hinds, *Zoölogy of the Voyage of H. M. S. Sulphur,* Pl. 5, fig. 7.

Pinkish ash-colored under a light olivaceous epidermis, the lines of growth, which are sometimes rib-like, oblique and angulated at the periphery and lighter-colored, so that the interspaces appear like angulated lines of chestnut or reddish narrow stripes; whole surface covered by close revolving incised lines. Length, 38; diameter, 13 mm. (Tryon, *Manual of Conchology.*)

TYPE in? Type locality?

RANGE. Baulinus Bay, California, to Ballenas Lagoon, Lower California. Fossil: Pleistocene—Santa Barbara, Ventura, San Pedro.

A new name for *Drillia inermis* Hinds.

Clathrodrillia halcyonis Dall, 1908

Plate 7, fig. 2; Plate 18, fig. 1

Proceedings of the United States National Museum, **34**:248; **56**: Pl. 8, fig. 1, 1919.

Shell small, slender, very acute, of a livid purple covered with an olivaceous periostracum, with about eleven whorls; nucleus more or less eroded, but apparently smooth, acute, and including about two and a half whorls; subsequent whorls rather flat, compressed and appressed at and in front of the suture, with a rounded base and inconspicuous anal fasciole; sculpture chiefly of flattish spiral threads, one at the suture, three smaller ones in front of it, followed by a flat broader one representing the fasciole, then (on the last whorl eight) more prominent threads, undulate or segmented by incremental lines and with wider interspaces (sometimes containing an intercalary smaller thread) to the base, followed by six or seven unsegmented threads to the siphonal fasciole, which bears six or seven smaller threads; the succession of undulations or slightly

swollen segments gives a slightly cancellated effect to the part of the whorl which bears them, but there are no axial ribs, the effect being produced rather by depressions between the rather coarse incremental lines; aperture narrow, acute behind, the anal sulcus narrow and distinct but not very deep, the outer lip in front of it arcuately produced, the canal contracted, short, and recurved; inner lip polished and superficially erased; the pillar twisted, with a thin layer of callus; operculum present. Height of shell, 23; of last whorl, 12.5; of aperture and canal, 8; maximum diameter, 7 mm. (Dall.)

TYPE in United States National Museum, No. 110644. Type locality, off Coronado Beach, San Diego, California.

RANGE. Burrard Inlet to San Diego, California.

Clathrodrillia fancherae Dall, 1903

Plate 19, fig. 8; Plate 3, fig. 4

Proceedings of the Biological Society of Washington, **16**:172. *Proceedings of the United States National Museum,* **56**: Pl. 8, fig. 3, 1919.

Shell slender, elongate, of a dark reddish-brown when fresh; nucleus somewhat swollen, smooth, of about two whorls; subsequent whorls about six or seven, similarly sculptured; axial sculpture of numerous low slender flexuous riblets with wider interspaces, extending from the suture to the periphery and obsolete on the base of the shell; these are crossed (between the sutures) by from four to six subequal threads, of which those on the periphery are somewhat more prominent, and all are slightly nodulous where they override the riblets; on the base there are about 15 of these threads with somewhat wider interspaces; aperture rather narrow, outer lip sharp, flexuous, the anal sulcus wide and shallow, halfway between the suture and the periphery; pillar lip smooth, canal rather long, straight, and open. Length of shell, 10.5; of last whorl, 6.0; max. diam., 3.0 mm. (Dall.)

TYPE in United States National Museum, No. 109303. Type locality, near Avalon, Catalina Island.

RANGE. Santa Rosa Island, California, to Point Abreojos, Lower California.

Clathrodrillia rhines Dall, 1908

Proceedings, Philadelphia Academy of Natural Sciences, 1865. *Proceedings of the United States National Museum,* **56**: Pl. 8, fig. 5, 1919.

D. t. "D. incisae juniore" simili, sed omnino albido, sculptura elevata, haud coelata epidermida tenui; anfr. nucleosis? . . . . (detritis); nor-

malibus iv. planatis, suturis distinctis; radiantibus circ. xx. angustis, acutioribus, et costulis spiralibus subaequantibus, quarum circiter v. in spira monstrantur, eleganter cancellatis, ad intersectiones subnodulosis; apertura obovali, in canalem longiorem, subarcuatam, apertam, producta; labro acuto, medio producto, ad costulam spiralem ex sutura tertiam eleganter sinuato, sinu altiore. (Carpenter.)

Shell like a young *incisa* in form, the spire decorticated, four planate whorls remaining, suture distinct, with about twenty small longitudinal ribs crossed by close revolving striae, cancellating the surface, and sometimes the intersections subnodulous. (Tryon, *Manual of Conchology.*)

Type locality, Puget Sound.

RANGE. Puget Sound to San Diego, California.

This is Carpenter's *Drillia cancellata.*

Genus **PSEUDOMELATOMA** Dall, 1918 (Drillia)

Shell fusiform, spire longer than the aperture, whorls longitudinally ribbed or nodulous, aperture oblong-ovate; sinus shallow, outer lip thin, inner lip with thin coating of enamel; canal short and nearly straight. Differs from *Clathrodrillia* in stronger sculpture and less prominent sinus. (Oldroyd.)

TYPE. *Drillia penicillata* Carpenter.

DISTRIBUTION. California and Lower California. Fossil: Pleistocene, San Pedro to San Diego, California.

Pseudomelatoma moesta Carpenter, 1865

Annals and Magazine of Natural History, ser. 3, **15**: 181. Tryon, *Manual of Conchology,* **6**: Pl. 12, fig. 38.

D. testa acuminata, laevi, dense olivaceo-fusca, epidermida laevi adhaerente induta; anfr. nucleosis? . . . . (decollatis); norm. viii., parum excurvatis, suturis parum distinctis; testa adolescente costis radiantibus circ. x. subobsoletis, elongatis, arcuatis, sinum versus interruptis, postice nodosis; anfr. ult. sculptura nulla; apertura elongata; canali brevi, aperto; columella recta; labio tenui; labro acuto, suturam versus sinuato, sinu parvo, expanso; operculo normali. Long., 1.1; long. spir., .65; lat., .36. (Carpenter.)

Shell dark brown under an olivaceous epidermis, with about ten curved longitudinal ribs, obsoletely nodulous on the periphery, with the whorls usually slightly constricted above it, ribs generally obsolete on the body-

whorl of adult specimens; suture narrowly corded and spotted; aperture chocolate within. (Tryon, *Manual of Conchology.*)

TYPE in British Museum. Type locality, Santa Barbara, California.

RANGE. Monterey, California, to Cerros Island, Lower California.

This was described as *Drillia moesta* by Carpenter.

Pseudomelatoma torosa Carpenter, 1865

Journal de Conchyliologie, 13:145. Tryon and Pilsbry, *Manual of Conchology,* 6: Pl. 14, fig. 93.

Testa acuminata, laevis, aurantio-fusca, epidermide aurantio-olivacea induta; anfr. nucleosis P—(detritis); normalibus 7 tumidioribus, suturis planatis; serie una tuberculorum validorum, subrotundatorum, anfractu-penultimo 8, anfr. ultimo haud obsoletis; regione sinus parvi, rotundati paulum excavata; regione suturali haud sculpta; canali longiore; columella recta; labio tenui; labro acuta, postice sinuato. Long., .95, long. spir., .55; lat., .3, poll. (Carpenter.)

Whorls rounded, olivaceous, with one row of strong bosses throughout; no posterior knobs. (Carpenter.)

TYPE in British Museum. Type locality, Monterey, California.

RANGE. Monterey to San Diego, California.

This was described as *Drillia torosa* by Carpenter.

Pseudomelatoma torosa aurantia Carpenter, 1865

Journal de Conchyliologie, 13:145.

D. torosae simili, sed aurantia; linea suturali expressa; interdum spiraliter sculpta. Long., .6; long. spir., .32; lat., .28 poll.

Orange, with sutural riblets and faint spiral sculpture. (Carpenter.)

TYPE in United States National Museum. Type locality, San Diego, California.

RANGE. Monterey, California, to Mazatlan, Mexico.

This was described as *Drillia torosa aurantia* by Carpenter.

Genus **CRASSISPIRA** Swainson, 1840 (Drillia)

Shell somewhat claviform, tuberculated; scarcely any anterior canal; internal lip with a thick posterior callus; external lip thick within. (Tryon, *Manual of Conchology.*)

TYPE. *Pleurotoma bottae* Valenciennes.

DISTRIBUTION. World-wide; low-water—100 fathoms. Fossil: Cretaceous.

Crassispira montereyensis Stearns, 1871

Proceedings, California Academy of Sciences, **5**: 80; Pl. 1, fig. 2.

Shell small, rather solid, elongate, slender; spire elevated, subacute; whorls, 7–8 moderately rounded; upper portion of larger volutions somewhat concavely angulated; suture distinct; color, dark purplish brown or black; surface covered with rather coarse, inconspicuous, revolving costae, interrupted on the body whorl by rude incremental lines; middle of upper whorls and upper part of body whorl displaying 14–15 equidistant, longitudinal, nodose, slightly oblique ribs, which are whitish in the specimen before me (being somewhat rubbed) on the larger whorls; on the smaller volutions of the spire a puckering at and following the suture suggests a second indistinct series of nodules; aperture less than half the length of the shell; canal short; terminal portion of columella whitish, slightly twisted; posterior sinus, rather broad, rounded, and of moderate depth. Long., .67; lat., .24 in. (R. E. C. Stearns.)

TYPE in United States National Museum, Stearns Collection. Type locality, Monterey, California.

RANGE. Monterey, California, to Mazatlan, Mexico.

This was described as *Drillia montereyensis* by Stearns.

Genus **CRYPTOGEMMA** Dall, 1918

Shell solid, fusiform, suture distinct. Canal distinct, and slightly recurved. Outer lip thin, generally produced. Inner lip thin and often with a thin layer of callus. Pillar short, straight. (Oldroyd.)

TYPE. *Gemmula benthina* Dall.

DISTRIBUTION. Tillamook, Oregon, to Tehuantepec in deep water.

Cryptogemma pernodata Dall, 1908

Bulletin, Museum of Comparative Zoölogy, **43**:266.

Shell defective, about three whorls remaining, resembling the last species (*Gemmula esuriens* Dall) in a general way, having the median vermiculate band, similar periostracum, aperture and pillar, but differing as follows: the whorls are separated by a deeper constriction; the fasciole less excavated and without spiral striae; the basal sculpture is hardly perceptible; the ribs are reduced to nodules in front of the suture and more obliquely protractive and irregular or even obsolete; the vermicular sculpture is more or less extended over the base. Long. of the last whorl, 14.0; of aperture, 10.0; maximum diameter, 8.7 mm. (Dall.)

TYPE in United States National Museum, No. 123127. Type locality, U.S.S. "Albatross" Station 3414, southwest of Tehuantepec, in the Pacific in 2,232 fathoms.

RANGE. Tillamook Bay, Oregon, to Tehuantepec, Mexico.

This was described as *Gemmula esuriens* var. *pernodata*.

Cryptogemma calypso Dall, 1919

Plate 3, fig. 3

Proceedings of the United States National Museum, **56**:31; Pl. 9, fig. 8.

Shell small, the nucleus always eroded, whitish with a dark dull olivaceous periostracum and about five remaining whorls; suture appressed, with a broad smooth ridge in front of it and behind the excavated anal fasciole; spiral sculpture in front of the shoulder of fine, even, close-set, equal threads, covering the surface, including the canal; axial sculpture of feeble incremental lines arcuate on the fasciole and antesutural ridge, also of narrow low sigmoid ribs beginning and forming a shoulder in front of the fasciole and obsolete in front of the periphery, differing in strength in different individuals and averaging fourteen on the last whorl; anal sulcus wide and deep, rounded; outer lip thin and sharp, much produced; inner lip with a thin layer of callus; pillar straight, short, obliquely attenuated in front; axis impervious; canal distinct, wide, hardly recurved. Height of (decollate) shell, 11; of last whorl, 7; diam., 4.7 mm. (Dall.)

TYPE in United States National Museum, No. 214067. Type locality, Station 2923, off San Diego, California, in 822 fathoms.

RANGE. Off San Diego, California, in 822 fathoms.

Cryptogemma herilda Dall, 1908

Bulletin, Museum of Comparative Zoölogy, **43**:266.

Shell rather small, stout, solid, chalky under an olivaceous periostracum; the spire longer than the aperture; whorls at least eight in the adult but usually much eroded; summit of the spire apparently blunt, the whorls in the young short in their axial dimension, giving a "chunky" aspect to the shell; early whorls with two beaded spiral series or cordons, one at the posterior suture, and another, larger, near the anterior suture. Between them is the anal fasciole; as the shell grows the anterior beaded cordon becomes situated nearer the center of the exposed whorl and (on the fourth whorl about twenty) the nodulations represent the posterior terminations of narrow very protractive axial riblets, which on the fifth

whorl fade out on the base; the anal fasciole is conspicuously marked with arcuate, close, fine ripples; in front of the shoulder in the young the whole base of the shell and canal are covered with close, fine, spiral threads, which, as the shell grows older, appear also on the anal fasciole; on the other hand, in the older shells the nodular band next the suture and that at the periphery become less prominently sculptured and the ribs almost obsolete; aperture and canal short and wide; pillar with little callus, straight, solid; outer lip produced, thin, sharp, simple; anal sulcus wide, shallow, in the older shells nearly reaching the suture. Length of shell, about 18; of last whorl, 11.5; of aperture, 8; maximum diameter, 7 mm. (Dall.)

TYPE in United States National Museum, No. 123091. Type locality, U.S.S. "Albatross" Station 3360, Gulf of Panama, in 1,672 fathoms.

RANGE. Santa Barbara, California, to Panama.

This was described as *Gemmula herilda* by Dall.

Cryptogemma cymothoë Dall, 1919

Proceedings of the United States National Museum, **56**:31; Pl. 9, fig. 3.

Shell much resembling the preceding species (*C. herilda*), from which it differs by having the anal fasciole striated spirally, the surface in front of the shoulder without spiral sculpture and minutely vermiculate, the ribs more knob-like, shorter, and averaging about 12 on the last whorl; whorls about six in number, the apex always eroded. Height of (decollate) shell, 9; of last whorl, 6.5; diameter, 5 mm. (Dall.)

TYPE in United States National Museum, No. 214067a. Type locality, Station 2923; off San Diego, California, in 822 fathoms.

RANGE. Santa Barbara Islands to San Diego, California, in deep water.

Cryptogemma polycaste Dall, 1919

Proceedings of the United States National Museum, **56**:30; Pl. 9, figs. 4, 7.

Shell white, with a pale olivaceous periostracum, and five whorls exclusive of the (lost) nucleus, rather slender and moderately rounded except for a single strong peripheral keel which marks the deepest part of the anal sulcus; suture distinct, not appressed, with a feebly indicated flattish area between it and the posterior edge of the anal fasciole, which between the keel and the flattening is slightly impressed; there is no other spiral sculpture, and the axial sculpture consists mostly of moderately prominent incremental lines; anal sulcus deep and wide; outer lip thin, prominently arcuately produced; inner lip smooth, pillar very short, gyrate; axis

pervious; canal produced, narrow, slightly recurved. Height of shell, 14; of last whorl, 9; diameter, 5.5 mm. (Dall.)

TYPE in United States National Museum, No. 212332. Type locality, Station 3346, off Tillamook Bay, Oregon, in 786 fathoms.

RANGE. Off Tillamook, Oregon, to Gulf of California.

Cryptogemma chrysothemis Dall, 1919

Plate 19, fig. 1

Proceedings of the United States National Museum, **56**:31; Pl. 11, fig. 2.

Shell short-fusiform, white, with a pale olive periostracum, the tip eroded, with six or more subsequent whorls; the suture distinct, the anal sulcus shallow, somewhat removed from the suture, the fasciole narrow, depressed; spiral sculpture of a low blunt peripheral keel, somewhat undulated on the earlier whorls with occasional traces of minor spiral threads; the entire surface is more or less obliquely granulose or minutely vermiculate; axial sculpture only of feeble incremental lines; outer lip thin, sharp, produced; inner lip erased; pillar short, obliquely attenuated in front; canal short, wide, not recurved; axis not pervious. Height of (eroded) specimen, 16.5; of last whorl, 11; diameter, 7.5 mm. (Dall.)

TYPE in United States National Museum, No. 208908. Type locality, Station 4405, between San Clemente and Santa Catalina Islands, California, in 654–704 fathoms.

RANGE. Between Clemente and Catalina Islands, California.

Cryptogemma adrastia Dall, 1919

Plate 11, fig. 2

Proceedings of the United States National Museum, **56**:33; Pl. 19, fig. 2.

Shell white, with a thin, pale olive periostracum, the apex invariably eroded, and the subsequent whorls, eight or more, polished and faintly showing incremental lines; suture inconspicuous, the anterior margin sometimes raised like a small cord; spiral sculpture of a strong, sometimes nodulous or undulated peripheral keel, rather nearer the succeeding suture than to the preceding one, the latter space occupied by the slightly concave anal fasciole; axial sculpture only of arcuate incremental lines; base rounded; aperture narrow, outer lip thin, sharp, produced, internally smooth; anal sulcus wide and shallow, with no parietal nodule; inner lip erased; pillar smooth, twisted, not pervious, attenuated obliquely toward the rather long, slightly recurved canal. Height of decollate specimen, of about 5 whorls, 16; last whorl, 11.7; diameter, 6.25 mm. (Dall.)

TYPE in United States National Museum, No. 226154. Type locality, Station 3670, Monterey Bay, California, in 578 fathoms.

RANGE. Monterey to San Diego, California, in deep water.

Cryptogemma eidola Dall, 1919

Proceedings of the United States National Museum, **56**:301.

Shell small, white, covered with an olivaceous periostracum, and with four whorls exclusive of an apical whorl or two (which in the specimens is always eroded), suture distinct, the edge of the whorl in front of it slightly thickened; spiral sculpture on the upper whorls of a somewhat blunt peripheral keel, undulated more or less toward the apex and obsolete on the last whorl; other sculpture of minute, broken, irregular, more or less oblique, usually punctate impressed lines; aperture simple, the outer lip sharp, the body erased, white, the canal short, somewhat recurved. Height of four whorls, 15; of last whorl, 10; diameter, 7 mm. (Dall.)

TYPE in United States National Museum, No. 212336a. Type locality, off San Diego, California, in 822 fathoms.

RANGE. Monterey to San Diego, California, in deep water.

Cryptogemma oregonensis Dall, 1919

Proceedings of the United States National Museum, **56**:301.

Shell small, white, with a pale olivaceous periostracum, and more than four whorls, the apex always eroded, the suture distinct, the whorl in front of the suture as far as the shoulder flattish; shoulder of the whorl strongly marked, angular, coronated by the ends of (on the penultimate whorl about 25) straight, protractively oblique narrow ribs with unequal interspaces, becoming obsolete on the base of the last whorl; incremental lines more or less distinct but not regular; spiral sculpture of one or two feeble impressed lines on the whorl above the shoulder, and three or four widely spaced threads on the base; though the region of the canal is free from spiral sculpture; aperture narrow, anal sulcus wide and shallow, outer lip produced, thin, body and pillar erased, canal rather short, axis pervious. Height of four whorls, 11; of last whorl, 7; diameter, 5 mm. (Dall.)

TYPE in United States National Museum, No. 214243. Type locality, Station off Tillamook, Oregon, in 786 fathoms.

RANGE. Off Tillamook, Oregon.

Genus **ANTIPLANES** Dall, 1902

Shell smooth except for incremental lines and sometimes fine spiral striae, the periostracum is conspicuous and the shell disposed to be chalky,

the anal sulcus shallow and more or less rounded, usually situated some distance from the suture, but not quite on the periphery of the whorl, the canal rather wide and long and often a little recurved, the aperture unarmed. There are both dextral and sinistral species. (Dall.)

TYPE. *Surcula perversa* Gabb.

Antiplanes perversa Gabb, 1865

Plate 11, fig. 9; Plate 28, fig. 8

Proceedings of the California Academy of Sciences, **5**:183. *Paleontology of California,* **2**:6; Pl. 1, fig. 10, 1866.

Shell small, sinistral, elongate, slender; spire high, apex usually bent to one side; whorls eleven to twelve, convex, two nuclear whorls rather loosely twisted and more convex than the others; suture deep; body whorl nearly half of the entire length of the shell. Aperture broadest in the middle, narrowing regularly in advance; inner lip moderately incrusted; outer lip simple; sinus rather broad, shallow, rounded, and adjoining the suture; canal of variable length, often much larger than in the specimen figured. Length, 38; diam., 11 mm. (Gabb.)

TYPE in? Type locality, San Pedro, Post-Pleiocene.

RANGE. Forrester Island, Alaska, to Cortez Banks.

This was described as *Pleurotoma perversa* by Gabb.

Antiplanes vinosa Dall, 1874

Plate 28, fig. 4

Proceedings of the California Academy of Sciences, **5**:253. *Proceedings of the United States National Museum,* **24**: Pl. 34, fig. 1, 1902.

This shell is closely allied to *P. perversa,* of Gabb, from the Straits of Fuca and Catalina Island, but differs in the following particulars: *P. perversa* has a light olivaceous epidermis, which gives a livid appearance to the light reddish brown of the whorls outside; and the broad, white band, with ill-defined edges, passes around the periphery of the shell, just covered by the suture in the upper whorls. The columella, end of the canal, and tip of the shell, are also white. The present form is of a uniform deep wine-brown, or claret color; is shorter and much less slender, with a shorter canal and proportionately much larger aperture. Both shells are reversed, and covered with fine, somewhat irregular spiral lines, not mentioned by Gabb in his diagnosis. (Dall.)

TYPE in United States National Museum. Type locality, Kyska Harbor, Great Kyaks Island, Alaska.

RANGE. Bering Sea to San Diego, California.

This was described as *Pleurotoma vinosa* by Dall.

Antiplanes kamchaticus Dall, 1919

Proceedings of the United States National Museum, **56**:33; Pl. 10, fig. 1.

Shell sinistral, large, coarse, with a shining brown periostracum over a yellowish substratum, the suture distinct, the spire acute, the whorls moderately rounded; axial sculpture only of sigmoid lines of growth, with six whorls exclusive of the nucleus and about a whorl and a half of the apex, which are missing; spiral sculpture of fine, close, subequal striations with slightly wider interspaces, covering the whole surface; aperture wide, the outer lip sinuous, simple, the anal sulcus shallow, the canal wide and short. Height of shell, 51; or last whorl, 32; diameter, 27 mm. (Dall.)

TYPE in United States National Museum, No. 225255. Type locality, western Bering Sea.

RANGE. Southwestern Bering Sea, in 48–100 fathoms.

Antiplanes catalinae Raymond, 1904

Nautilus, **18**:2.

Shell sinistral, thin, elongated, slender, whorls ten to eleven; color light pinkish-brown, without bands, interior of aperture a little lighter; upper whorls more or less chalky; nucleus smooth, inflated; later whorls convex, suture deeply impressed; sculptured by fine incremental lines and on the last whorls a few obscure spiral striations, mostly below the periphery; anal fasciole traceable on the spire as a flattened or obscurely grooved band; aperture narrow; canal wide and short; pillar nearly straight, with a well-defined callus, obliquely truncate below; outer lip produced, deeply emarginate near the sutural margin of the whorl. Long. of shell, 27; of aperture and canal, 10.5; max. diam., 7.6 mm. (Raymond.)

TYPE in University of California Collection. Type locality, off Catalina Island, in 125 fathoms.

RANGE. Esteros Bay to San Diego, California.

This was described as *Pleurotoma catalinae* by Raymond but placed in Section *Antiplanes.*

Antiplanes rotula Dall, 1919

Paleontology of California, 216; Pl. 6, fig. 13, 1903.

New name for *A. smithi* Arnold, 1903.

Shell elongate, turreted, slender; spire elevated; apex obtuse, mammilliform; whorls ten, convex, with a slight tendency toward angulation on the lower third of the whorl, and abruptly terminated at the posterior margin; suture very deeply impressed, distinct; sculpture consists simply

of oblique, incremental lines, which are quite deeply angulated convexly, posteriorly just a little above the middle of the whorl; aperture narrow, oblique; outer lip thin, arcuate anteriorly; inner lip smooth and incrusted; posterior sinus deep and remote from suture; canal narrow, slightly recurved, over one-third of the aperture. Long., 35; lat., 11; body whorl, 8.5; diameter, 13 mm. (Arnold.)

TYPE in United States National Museum. Type locality, Pleistocene, San Pedro, California.

RANGE. Forrester Island, Alaska, to San Diego, California. Fossil at San Pedro, California.

This was described as *Pleurotoma smithi* by Arnold.

Antiplanes santarosana Dall, 1919

Plate 6, fig. 1

Proceedings of the United States National Museum, **24**:515; **56**: Pl. 11, fig. 3.

Shell elongated, slender, acute, with twelve whorls, of an olivaceous or pinkish brown; the interior of the aperture of a pale rufescent hue; whorls rounded, suture very distinct, sculpture chiefly of incremental lines and a faint spiral striation mostly below the periphery; anal fasciole limited by slightly raised lines; nucleus small, inflated, smooth; aperture narrow, with a short, wide canal; pillar solid, short, obliquely truncate; outer lip thin, produced, with a deep anal sulcus a little in advance of the sutural margin of the whorl. Operculum normal. Long. of shell, 36; of aperture and canal, 11.5; max. diam., 9 mm. (Dall.)

TYPE in United States National Museum, No. 109198. Type locality, off Santa Rosa Island, California, in 53 fathoms.

RANGE. Off Santa Rosa Island to San Diego, California.

This was described as *Pleurotoma santarosana* by Dall.

Antiplanes diaulax Dall, 1908

Proceedings of the United States National Museum, **34**:247.

Shell small, acute, conic, brownish, with about nine whorls; suture distinct, not appressed; surface smooth, except for incremental lines and two impressed shallow spiral channels near the periphery of the whorls; the surface just behind each channel is slightly raised, forming a flattish band about as wide and high as the channel is wide and deep; on the base and canal there are also some faint spiral threads; the sides of the spire are flattish, the periphery nearest the succeeding suture which is laid on the anterior edge of the anterior channel, thus giving the whorls a sort

of overhanging appearance; aperture short and rather narrow; outer lip sharp, simple, produced; anal sulcus narrow and rather deep, situated just behind the posterior channel; body without callus; canal short, wide, recurved; pillar lip arcuate, smooth. Height of shell, 19; of last whorl, 10; of aperture, 6.5; max. diam., 6.5 mm. (Dall.)

TYPE in United States National Museum, No. 110609. Type locality, Station 2931, off Los Coronado Islands.

RANGE. Off Coronado Islands, Mexico.

This was described as *Turris diaulax* by Dall.

Antiplanes briseis Dall, 1919

Proceedings of the United States National Museum, **56**:35; Pl. 22, fig. 1.

Shell elongate, acute, white, covered with a very pale olivaceous periostracum, with a blunt, swollen nucleus of about a whorl and a half (eroded) and eight subsequent rather flattish whorls; suture obscure, appressed; spiral sculpture of one or two feeble flattish cords between the periphery and the succeeding suture on the spire, and on the last whorl about twice as many more or less obsolete; axial sculpture of rather prominent, deeply arcuate incremental lines; anal fasciole wide, not impressed, the deepest part of the sulcus near the periphery; aperture narrow, outer lip thin, sharp, much produced; inner lip and pillar erased, the latter short, straight, obliquely attenuated in front; canal distinct, produced, straight. Height of shell, 18; of last whorl, 10; diameter, 5 mm. (Dall.)

TYPE in United States National Museum, No. 212329. Type locality, Station off Drake's Bay, California, in 30 fathoms.

RANGE. Drake's Bay, Coronado Islands.

Antiplanes thalaea Dall, 1902

Plate 6, fig. 3; Plate 3, fig. 8

Proceedings of the United States National Museum, **24**:514; **56**: Pl. 11, fig. 6.

Shell solid, heavy, with an elongated spire constricted at the sutures, and eight or more whorls; nucleus eroded; surface covered with a pale apple-green periostracum, which fades in time to a greenish-gray; surface sculptured only by incremental lines, faint spiral lines, a slight depression of the anal fasciole, and irregular, feeble, broken, short, elevated lines which are scattered over the surface and usually directed at right angles to the incremental lines; aperture short and narrow, with a short and wide canal; outer lip with a deep anal sinuosity, leaving a slightly depressed fasciole behind it; anterior part of the outer lip much produced and

rounded, thin and simple; pillar stout, white, short, obliquely truncate in front; canal wide, short, slightly flaring; base somewhat constricted, with a spiral striae stronger than on the rest of the surface. Long., 40; aperture, 15; maximum diameter, 12 mm. Long. of shell, 40; of aperture, 15; max. diam., 12 mm. (Dall.)

TYPE in United States National Museum, No. 122568. Type locality, off San Luis Obispo, California, in 252 fathoms.

RANGE. Unimak Pass, Aleutian Islands, to San Diego, California.

This was described as *Pleurotoma* (*antiplanes*) *thalaea* by Dall.

Antiplanes bulimoides Dall, 1919

Proceedings of the United States National Museum, **56**:34; Pl. 11, fig. 7.

Shell elongate, decollate, whorls six or more, four distinctly remaining, suture distinct, not appressed, whorls moderately convex, smooth, with a pale, polished, greenish periostracum over a white substratum, in spots minutely granulose, apparently from some wrinkling of the periostracum; anal sulcus wide, shallow, hardly forming a fasciole; outer lip thin, sharp, moderately produced; inner lip with a thin white layer of callus; pillar straight, with an anterior oblique attenuation; canal wide, hardly differentiated. Length of three complete whorls, 31; of last whorl, 23; diameter at apex, 5; maximum diameter, 15 mm. (Dall.)

TYPE in United States National Museum, No. 111051. Type locality, Station 4772, on Bowers Bank, Bering Sea, in 344 fathoms.

RANGE. Bowers Bank, Bering Sea.

Antiplanes abarbarea Dall, 1919

Plate 3, fig. 6

Proceedings of the United States National Museum, **56**:35; Pl. 9, fig. 5.

Shell whitish, acute, with one globular nucleus and six and a half subsequent well-rounded whorls; suture distinct, not appressed; spiral sculpture of faint obscure grooves with wider interspaces over the whole spire but obsolete on the last whorl, and a series of faint, irregular peripheral nodulosities on the upper part of the spire; axial sculpture of rather coarse, irregular, incremental lines, retractively arcuate in front of the suture, though there is no distinct fasciole; aperture elongate, anal sulcus close to the suture, rather deep; outer lip thin, smooth inside, inner lip erased; pillar straight, smooth, attenuated in front; canal short, wide, nearly straight. Height of shell, 21.5; of last whorl, 13.5; diameter, 8 mm. (Dall.)

TYPE in United States National Museum, No. 224393. Type locality, Station 2954, off Santa Rosa Island, California, in 55 fathoms.

RANGE. Cape Martin to Cortez Bank, California.

Antiplanes hyperia Dall, 1919

Plate 3, fig. 2

Proceedings of the United States National Museum, **56**: 35; Pl. 9, fig. 6.

Shell with more than six hardly rounded whorls (decollate), white, with a dark olive periostracum, the base white; suture appressed, distinct, the whorl in front of it constricted; spiral sculpture of (on the last whorl) a sharp thread or low keel above the periphery, two more at the periphery; on the anterior one the suture is laid and it also forms the anterior boundary of the dark coloration; on the base are five less conspicuous threads; all these have much wider interspaces; axial sculpture of moderately inconspicuous incremental lines; anal sulcus wide and extremely shallow, the deepest portion at the posterior keel; there is no well-defined fasciole; aperture short and wide, outer lip thin, only slightly produced in front of the sulcus; inner lip erased; pillar very short; canal very short and wide, but distinct, slightly recurved and with an inconspicuous siphonal fasciole. Height of five whorls, 12; of last whorl, 7; diameter of decollation, 1.7; of last whorl, 4.5 mm. (Dall.)

TYPE in United States National Museum, No. 212329a. Type locality, Station off Drake's Bay, California, in 30 fathoms.

RANGE. Off Drake's Bay to Coronado Islands.

Antiplanes beringi Aurivillius, 1885

Vega Expeditionens, Vetenskapliga Iakttagelser, **4**: 354; Pl. 13, fig. 3.

Vindlingar 7½, svagt konvexa, medolivgron—brungul, slät och glänsandle epidermis, som blott visar fina, på midten vinskärningen på yttre munkanten endast 2 mm. djup; callus på columella svag; kanalen kort och rak samt bred (dess bredd. 4 mm. på det större ex.). Mynning och svalg glänsande gulröda—svgt rosenfär gade. Langd., 39; bredd., 17 mm. (Aurivillius.)

TYPE in Natur-historiska Riksmuseum, Stockholm? Type locality, Arctic?

RANGE. Bering Sea, south of St. Lawrence Islands, to Aleutian and Shumagin Islands.

Antiplanes litus Dall, 1919

Plate 19, fig. 4

Proceedings of the United States National Museum, **56**: 34; Pl. 11, fig. 1.

Shell slender, white, acute, with seven or eight moderately convex whorls separated by a very distinct suture; nucleus swollen, twisted, of two

whorls, the second spirally threaded; on about three of the subsequent whorls these threads are developed into two or three major cords between the periphery and the suture, becoming on later whorls obsolete, or this sculpture in other specimens may be obsolete; there is also a semi-obsolete, fine, spiral striation covering the whole surface and somewhat stronger on the canal; there is no axial sculpture; aperture narrow, anal sulcus feeble, close to the suture hardly forming a fasciole; outer lip thin, slightly produced; inner lip erased; pillar straight; canal short, wide. Height of shell, 16; of last whorl, 9; diameter, 5 mm. (Dall.)

TYPE in United States National Museum, No. 206602. Type locality, Station 3194, off Esteros Bay, California, in 92 fathoms.

RANGE. Coast of Washington to Esteros Bay, California.

Antiplanes amphitrite Dall, 1919

Proceedings of the United States National Museum, **56**:37; Pl. 9, fig. 1.

Shell white, covered with a pale, olivaceous periostracum, of five or more well-rounded whorls exclusive of the (lost) nucleus, having a rounded shoulder and distinct, not appressed suture; axial sculpture of, on the spire, obscure nodulations at the shoulder (about 15 on the penultimate whorl), which do not form ribs and are absent from the last whorl; incremental lines fine but obscure; besides these there are minute, anteriorly, obliquely retractive lines somewhat microscopical, reticulated by the lines of growth; there is no spiral sculpture except on some specimens a few obsolete lines on the base; anal sulcus shallow, slightly removed from the suture, the fasciole lightly impressed on the last whorl; aperture narrow, the outer lip thin, sharp, arcuately produced; inner lip erased; pillar white, solid, straight, anteriorly obliquely attenuated; canal wide, straight, distinct. Height of five whorls, 13.5; of last whorl, 10; diameter, 6 mm. (Dall.)

TYPE in United States National Museum, No. 209953. Type locality, Station 4415, off Santa Barbara Island, California, in 638 fathoms.

RANGE. Off Santa Barbara Island, California, in 638 fathoms.

Antiplanes amphitrite beroë Dall, 1919

Proceedings of the United States National Museum, **56**:37.

This variety differs in being larger, with the suture appressed, the fasciole close to it, and bearing three or four spiral grooves. Height of four whorls, 19; of last whorl, 14; diameter at decollation, 2.5; of last whorl, 9 mm. (Dall.)

TYPE in United States National Museum, No. 21466a. Type locality, off San Diego, California, in 822 fathoms.

RANGE. Known only from type locality.

Antiplanes antigone Dall, 1919

Proceedings of the United States National Museum, **56**:32; Pl. 11, fig. 4.

Shell solid, white with an olivaceous periostracum, spire badly eroded, short, indicating a total of five whorls exclusive of the nucleus, the last whorl and a half alone retain their normal condition; suture distinct, not appressed; anal fasciole narrow, constricted, separated from the suture by an obscure ridge; in front of the fasciole is an undulated rounded bridge from which extend obliquely protractive obscure riblets more or less obsolete on the last whorl, probably stronger and more distinct on the spire when not eroded; there is also obscure spiral grooving with much wider interspaces on the base; the entire surface is minutely irregularly vermiculate; aperture narrow; anal sulcus shallow, rounded, close to the suture; outer lip thin, sharp, moderately produced; inner lip erased, pillar short, white, obliquely attenuated in front; canal short, wide, hardly differentiated. Height of (decollate) shell, 23; of last whorl, 18; diameter, 10 mm. (Dall.)

TYPE in United States National Museum, No. 214066b. Type locality, Station 2922, off San Diego, California, in 822 fathoms.

RANGE. Off San Diego, California, in 822 fathoms.

Antiplanes amycus Dall, 1919

Proceedings of the United States National Museum, **56**:36; Pl. 11, fig. 5.

Shell white, covered with a brownish olive periostracum; with five or more moderately rounded whorls exclusive of the (lost) nucleus; suture distinct with a wide, rounded ridge in front of it, forming the posterior boundary of the anal fasciole; spiral sculpture of a few obscure threads on the fasciole and in front of the shoulder 8 or 9, on the last whorl 15–13 flattish, rather close-set threads smaller and closer anteriorly and absent from the canal; axial sculpture of more or less distinct incremental lines, and the upper spire of about 15 very oblique anteriorly protracted riblets chiefly visible at the shoulder and obsolete on or entirely absent from the last two whorls; anal sulcus wide, deep, rounded, the fasciole slightly impressed; outer lip thin, sharp, arcuately produced; inner lip erased, pillar short, white, obliquely attenuated in front; canal short, wide, distinct, slightly recurved. Height of four whorls, 21.5; of last whorl, 15; diam. at decollation, 3; of last whorl, 9.5 mm. (Dall.)

TYPE in United States National Museum, No. 226163. Type locality, off Monterey Bay, California, Station 3670.

RANGE. Monterey Bay, in 581 fathoms.

Antiplanes agamedea Dall, 1919

Proceedings of the United States National Museum, **56**:33; Pl. 24, fig. 2.

Shell small, white, covered with an olivaceous periostracum, with more than five whorls, apex eroded, the periphery with a rounded keel; spiral sculpture of a thickened flattish ridge in front of the channeled suture, and obscure spiral treading on the impressed anal fasciole and base, the canal smooth; axial sculpture of fine incremental lines more or less reticulating; the spirals and arcuate over the fasciole, the peripheral keel on the spire nearer the succeeding than the preceding suture; aperture elongate, the outer lip thin, smooth within, arcuately produced in front of the fasciole; inner lip erased, pillar short, solid, obliquely attenuated in front, straight. Height of four whorls, 10.5; of last whorl, 8; diameter, 5 mm. (Dall.)

TYPE in United States National Museum, No. 211759. Type locality, Station 2936, off Cape San Quentin, Lower California.

RANGE. Off Cape San Quentin in 359 fathoms.

Genus **BORSONELLA** Dall, 1908

Shell with a small, blunt nucleus of one or two whorls, sculpture chiefly spiral, feeble, except for one or two spiral carinae, sometimes with a few small riblets or beads on the principal carina; periostracum conspicuous, smooth or vermiculate; canal wide and very short; outer lip sharp, simple arcuate; pillar solid, with one strong, nearly horizontal plait continuous upon the whole axis; axis impervious, operculum absent.

TYPE. *Borsonella dalli* Arnold.

Borsonella omphale Dall, 1919

Plate 19, fig. 6

Proceedings of the United States National Museum, **56**:38; Pl. 12, fig. 4.

Shell slender, acute, with eight flattish whorls exclusive of the (lost) nucleus, white covered by a very light olive gray periostracum; suture distinct, fasciole hardly impressed; spiral sculpture of obscure striae, sparser on the base; axial sculpture of incremental faint lines arcuate on the anal fasciole; aperture narrow, anal sulcus wide, moderately deep; outer lip thin, prominently arcuate in front of the periphery; inner lip erased; pillar strong with a single fold near the body; attenuated in front; canal short. Height of shell, 16; of last whorl, 10; diameter, 6 mm. (Dall.)

TYPE in United States National Museum, No. 209174. Type locality, Station 4309, off Point Loma, California.

RANGE. Known only from the type locality.

Borsonella dalli Arnold, 1903

Plate 6, fig. 8

Paleontology of California, 201; Pl. 6, fig. 2.

Shell small, fusiform; spire elevated; apex mammilliform; whorls eight, sharply angulated a little anterior of middle; body-whorl less angulated than those of the spire; posterior portion flat to slightly concave, anterior portion slightly convex; first four whorls slightly nodose on angle; ornamentation consists of fine oblique incremental lines which are convexly angulated posteriorly just posterior to angle of whorl; suture deeply impressed, distinct; aperture elongate-elliptical; outer lip thin, arcuate anteriorly; inner lip incrusted; columella slightly recurved, with one prominent plication in middle of aperture; posterior sinus prominent; anterior sinus rather short. Long, 23.5; lat., 9; body whorl, 13; aperture including canal, 10 mm. (Arnold.)

TYPE in United States National Museum. Type locality, Lower San Pedro series, at Deadman Island.

RANGE. Drake's Bay, California, to Coronado Islands; also Pleistocene of San Pedro.

This was described as *Pleurotoma* (*Borsonia*) *dalli* by Arnold.

Borsonella coronadoi Dall, 1908

Bulletin, Museum of Comparative Zoölogy, **43**:277; Pl. 14, fig. 2.

Shell slender, acute, pinkish white, with a pale brown periostracum and about ten whorls; spire longer than the aperture, the nuclear whorls smooth, turgid, the subsequent turns carrying a rounded low keel, usually in front of the middle of the whorls forming the spire, the arca between which and the suture is flatly impressed, the whorl in front gently rounded; on some of the early whorls the keel is slightly undulated, but not regularly nodulous; besides the lines of growth, both fasciole and the anterior part of the whorl show indications under a lens of obscure regular distant spiral striae, and are also more or less marked with a faint vermicular reticulation of the surface; suture not appressed, distinct; aperture narrow, anal sulcus deep and wide, reaching the suture; outer lip thin, sharp, arcuately produced; inner lip slightly eroded, polished, with no callus; plication at the proximal end of the pillar; axis impervious, canal short, wide, deep, slightly recurved with a fairly well-marked fasciole. Long. of shell, 29; of last whorl, 16.5; of aperture, 12; max. diam., 9 mm. (Dall.)

TYPE in United States National Museum, No. 110608. Type locality, Station 2931, off Los Coronados Islands.

RANGE. San Clemente Island to Coronado Islands.

This was described as *Borsonia* (*Borsonella*) *coronadoi* by Dall.

Borsonella diegensis Dall, 1908

Plate 6, fig. 4

Bulletin, Museum of Comparative Zoölogy, **43**:275; Pl. 13, fig. 11.

Shell small, stout, solid, decollate, with a whitish substratum and strong ovilaceous perisotracum; the four remaining whorls are closely coiled and have the aperture longer than the remaining portion of the spire; the sculpture consists of a strong spiral keel; periphery on the spire with more or less nodulation (in one specimen with fifteen small nodules on the penultimate whorl, but none on the last whorl; another has them obsolete on the spire), stronger on the earlier whorls when present, an obscure ridge in front of the suture, stronger on the earlier whorls, faint spiral striation on the anal fasciole between the ridge and the keel, the whole surface covered with a microscopic, close, impressed, vermicular network of fine lines anastomosing in every direction; on the last whorl the keel is well above periphery; base evenly rounded, aperture ample, anal sulcus at the suture wide and deep; outer lip thin, arcuately produced; pillar lip smooth, with a glaze of callus, the plication on the proximal part of the pillar lagging behind the aperture; canal very wide and short with an obsolete fasciole. Length of four whorls, 15; of last whorl, 12.5; of aperture, 9.5; max. diam., 8 mm. (Dall.)

Type in United States National Museum, No. 122573. Type locality, Station 2923, off San Diego, California, in 822 fathoms.

Range. Off San Diego, California, to Panama, Ecuador, and Galapagos Islands.

Borsonella barbarensis Dall, 1919

Plate 6, fig. 10

Proceedings of the United States National Museum, **56**:37; Pl. 12, fig. 6.

Shell solid, of six or more whorls, the apex decollated, the periostracum greenish olive over a white substratum, yellowish on the pillar; suture distinct with a convex spiral band between it and the fasciole; spiral sculpture of a pronounced keel in front of the fasciole, on the upper part of the spire this keel may be more or less undulated; in front of the keel the surface is retractively somewhat irregularly obliquely grooved, with wider flattish interspaces upon which is a minute protractively looped sculpture giving a vermicular aspect to the surface under a magnifier; aperture ovate, simple, the outer lip thin, and sharp, the anal sulcus wide and moderately deep, the pillar straight, attenuated in front, the plait hidden behind it, the canal short and wide, the operculum missing. Height of shell, 29; of last whorl, 20; diameter, 12 mm. (Dall.)

TYPE in United States National Museum, No. 96841. Type locality, off Santa Barbara Island, California, in 302–614 fathoms.

RANGE. Off Santa Barbara Islands in 414 fathoms.

Borsonella rhodope Dall, 1919

Proceedings of the United States National Museum, **56**: 39; Pl. 12, fig. 3.

Shell with seven or more whorls exclusive of the (lost) nucleus, white covered with a pale olivaceous periostracum, suture distinct, not appressed; axial sculpture of rather strong irregular incremental lines; spiral sculpture of a thickened band between the suture and the somewhat constricted anal fasciole; at the shoulder a blunt angulation, in front of which are two obscure threads followed by a more distinct thread on which the suture is laid; on the last whorl in front of the angulation are about 18 threads growing smaller and more close-set anteriorly; there is no siphonal fasciole; aperture rather narrow, anal sulcus shallow rounded, outer lip thin, arcuate, sharp; inner lip erased, pillar straight, obliquely attenuated in front; canal rather wide, not recurved. Height of shell, 19; of last whorl, 11; diameter, 7 mm. (Dall.)

TYPE in United States National Museum, No. 212361. Type locality, Station 2953, off Santa Rosa Island, in 82 fathoms.

RANGE. Off Santa Rosa Island, in 82 fathoms, to San Diego, in 633 fathoms.

Borsonella bartschi Arnold, 1903

Paleontology of San Pedro, California, 200; Pl. 5, fig. 7; Pl. 9, fig. 1.

Shell small, fusiform, elongate; apex obtuse; mammilliform; whorls seven, angulated near middle; body-whorl less angulated than those of spire; anterior portion of whorl ornamented with about 12 oblique, transversely elongated nodes, which reach their greatest prominence on the angle of the whorl; body-whorl sometimes smooth and sometimes nodose; posterior portion of the whorl flat and smooth except for incremental lines; incremental lines fine, oblique, and angulated convexly posteriorly on upper portion of the whorl; suture deeply appressed, distinct; aperture elongate-elliptical; outer lip thin, arcuate anteriorly below posterior sinus; inner lip incrusted; columella nearly straight, incrusted, with one sharp plication in middle of aperture; posterior sinus shallow; anterior sinus prominent. Long., 19; lat., 7; body-whorl, 11.5; aperture and canal, 8.5 mm. (Arnold.)

TYPE is in United States National Museum. Type locality, Lower San Pedro, series Deadman Island.

RANGE. San Pedro to San Diego, California; also Pleistocene.

This was described as *Pleurotoma* (*Borsonia*) *bartsch* by Arnold.

Borsonella nychia Dall, 1919

Proceedings of the United States National Museum, **56**:38; Pl. 12, fig. 2.

Shell white, with an olivaceous periostracum, biconic, acute, the nucleus (eroded) of one or two whorls, with about six subsequent whorls, rapidly enlarging, flatly descending from a distinct, not appressed suture to the periphery and with the last whorl conically attenuated in front; spiral sculpture of an obscure thickening in front of the suture; fine rather irregular striae thence to the periphery, crossed obliquely by irregular scratches, a prominent angle at the periphery, which on the spire is just behind the suture, and on the last whorl is ornamented with nine or ten prominent nodules with wider interspaces; on the base the striae are coarser and more irregular, the interspaces assuming the form of (about 15) flattish threads, sparser on the canal; axial sculpture of fine incremental lines arcuate on the anal fasciole; aperture elongate triangular, the anal sulcus very wide and shallow, outer lip thin, sharp, smooth within, arcuate in front of the periphery; inner lip erased, pillar solid, short, with a single plication near the body, attenuated in front, straight; canal hardly differentiated, somewhat produced. Height of shell, 12; of last whorl, 8; diameter, 5.5 mm. (Dall.)

TYPE in United States National Museum, No. 208891. Type locality, Station 4361, off Point Loma, California, in 101 fathoms.

RANGE. Off Point Loma, California, in 101 fathoms.

Borsonella civitella Dall, 1919

Proceedings of the United States National Museum, **56**:302.

Shell fusiform, elongate, acute, of a pale buff color, of eight or more whorls, the nucleus defective, the suture distinct, not appressed; axial sculpture of (on the penultimate whorl, nine) short, prominent ribs conspicuous only on the periphery and obsolete on the later part of the last whorl; the incremental lines are also rather conspicuous; there is no spiral sculpture except a few faint lines on the anal fasciole which is adjacent to the suture; in addition to the above there are minute oblique striae often punctate, with wider interspaces which cross the incremental lines almost at right angles; these, hardly visible except under a lens, give the surface a vermiculate aspect; aperture rather narrow, the anal sulcus wide and shallow, the outer lip strongly protractively arcuate, thin, simple; inner

lip with a thin wash of callus, pillar straight with a single plait, throat yellowish, canal wide, straight. Height of shell, 19; of last whorl, 11.5; of aperture, 8; diameter, 6.5 mm. (Dall.)

TYPE in United States National Museum, No. 209034. Type locality, Station 4310, off Point Loma, California.

RANGE. Off Point Loma, California, in deep water.

Borsonella nicoli Dall, 1919

Proceedings of the United States National Museum, **56**:39; Pl. 12, fig. 1.

Shell solid, white, covered with a pale straw-colored periostracum, of eight whorls exclusive of the (lost) nucleus, the suture distinct with a slightly swollen margin; axial sculpture of (on the penultimate whorl about nine) nodular ribs, peripheral on the spire, becoming obsolete on the last whorl, beginning in front of the fasciole and obscure beyond the periphery; spiral sculpture of fine striae, visible only in occasional spots, the fasciole somewhat constricted; beside this there are faint traces of vermicular sculpture visible under a glass, reminiscent of the sculpture in *B. barbarensis*; aperture narrow, anal sulcus moderately deep, outer lip thin, arcuate, body and pillar smooth, the plait hidden behind the columella which is attenuate in front, canal short and wide. Height of shell, 22; of last whorl, 13; diameter, 8 mm. (Dall.)

TYPE in United States National Museum, No. 198925. Type locality, southwest of San Nicolas Island, California, in 158 fathoms.

RANGE. San Nicolas Island to Point Loma, California.

Genus **LORA** Gistel, 1848

Shell oblong-ovate, somewhat solid, white, slightly convex, lip flaring, small, coated internally with callus; aperture expanding in front. (Gistel.)

A free translation.

TYPE. *Defrancia viridula* Fabricius.

Lora impressa Mörch, 1869

Société Malacologique de Belgique, Mémoires, **4**: 21. Leache, *Novaia zeml. Expedition Moll.;* Pl. 1.

T. alba, epidermide flavescenti cinerea; anfractibus longitudinaliter dense costellatis, lines spiralibus 9–10 profunde impressis in anfractu ultimo; lines 2–3 posteriores remotae in anfractibus spirae percurrunt, unde nodis quadrangularibus in intersectionibus costarum; anfr. ult. spiram paulo superans. Long., 15; long. aperture, 8; diameter, 7 mm. (Mörch.)

Shell wide, with short spire, and sloping but rather well-defined shoulder; densely costulate longitudinally, crossed by about ten spiral riblets, forming a cancellated surface; yellowish ash-color. (Tryon, *Manual of Conchology.*)

TYPE in Copenhagen. Type locality, Bellsound, 5 examplarres. (Kroyer.)

RANGE. Sea Horse Islands, Arctic Ocean, to Kodiak Island, Alaska. Circumboreal.

Described as *Bala impressa.*

Lora scalaris Möller, 1842

Plate 7, fig. 8

Index Molluscorum Grönlandiae, **12.** G. O. Sars, *Mollusca regionis arcticae Norvegiae;* Pl. 23, fig. 5, 1878.

Testa ovata-fusiformi, alba vel rubicunda; anfr. 6 justa suturam angulatis, longitudinaliter lineis impressis cinctis, transversim costulatis; spira acuminata, longiore quam venter. L.6,5‴. (Möller.)

Shell ovate fusiform, white or reddish; with six whorls angulate to the suture, girdled longitudinally with impressed lines, transversely costulate; spire acuminate, longer than the venter. (Translation.)

TYPE in Copenhagen. Type locality, Greenland.

RANGE. Bering Sea to Sitka, Alaska. Circumboreal.

Lora inequita Dall, 1919

Proceedings of the United States National Museum, **56**:44; Pl. 16, fig. 9.

Shell yellowish white, thin, of about six moderately rounded whorls, the nucleus eroded; suture distinct; spiral sculpture on the early of two strong cords one on each side of the periphery, between which are first one, later two, and finally four smaller threads; the posterior cord gives the whorl a slight shoulder; on the last whorl in front of the anterior cord to the end of the canal are smaller, more or less alternate flattish cords, close-set, the interspaces wider on the canal; axial sculpture of (on the penultimate whorl about 20) rounded sigmoid ribs with wider or subequal interspaces, crossing the early whorls, becoming less evident on the later whorls, and obsolete on the base of the last whorl; the incremental lines are more or less evident; aperture narrow, simple; pillar white, erased, attenuated in front. Height of shell, 11; of last whorl, 7; diameter, 4 mm. (Dall.)

TYPE in United States National Museum, No. 222238. Type locality, Plover Bay, Bering Sea.

RANGE. Plover Bay to Boca de Quadra, Alaska.

Lora kyskana Dall, 1919

Plate 7, fig. 11; Plate 18, fig. 2

Proceedings of the United States National Museum, **56**:47; Pl. 14, fig. 3.

Shell belonging to the *L. fidicula* Gould, but with looser and less regular sculpture, white, the nucleus defective, with about six shouldered whorls, suture distinct, anal fasciole obscure, undulated by the ends of the ribs, spirally striated; axial sculpture of (on the last whorl 14 or 15) rounded ribs with wider interspaces, prominent at the shoulder, crossing the whorls at the spire, obsolete on the base; spiral sculpture of numerous narrow channeled grooves with wider flattish interspaces, not nodulating the summits of the ribs; on the spire the interspaces are more cordlike, six or seven between the shoulder and the succeeding suture; aperture simple, inner lip erased, canal short, straight. Height of shell, 10.5; of last whorl, 7; diameter, 4.5 mm. (Dall.)

TYPE in United States National Museum, No. 224286. Type locality, Kyska Island, Alaska.

RANGE. Kyska Island, Alaska, to Puget Sound.

Lora quadra Dall, 1919

Plate 7, fig. 12; Plate 18, fig. 6

Proceedings of the United States National Museum, **56**:46; Pl. 15, fig. 2.

Shell short and stout, white with about five whorls, the apex eroded, suture distinct, the anal fasciole narrow, excavated, finely spirally striated; axial sculpture of (on the last whorl about 18) stout nearly vertical ribs angulated at the edge of the fasciole, forming a narrow shoulder, but without a limiting cord, with usually narrower interspaces and obsolete on the base, the incremental lines not conspicuous; spiral sculpture of spiral grooves with much wider flat interspaces, the canal constricted, spirally threaded, very short; aperture simple, inner lip erased. Height of shell, 8; of last whorl, 6; diameter, 4.5 mm. (Dall.)

TYPE in United States National Museum. No. 223606a. Type locality, Unalaska, Aleutian Islands.

RANGE. Unalaska, Aleutian Islands, to Puget Sound.

Lora althorpensis Dall, 1919

Proceedings of the United States National Museum, **56**:49; Pl. 16, fig. 11.

Shell waxen yellow, coarsely sculptured, small, of about six whorls, including one smooth nuclear turn; suture distinct, anal fasciole obscure; anal sulcus very feeble; spiral sculpture on the early whorls of two strong

rows of nodules on the ribs, the cords connecting them less conspicuous; on the last whorl there are about 14 cords, but only at the shoulder is conspicuous, the interspaces are narrower with an occasional intercalary thread; axial sculpture of (on the penultimate whorl about 20) narrow nearly vertical ribs with subequal interspaces reticulating the spirals, with deep interstices, but on the last whorl becoming obsolete; aperture narrow, inner lip erased, canal short, straight. Height of shell, 6.5; of last whorl, 4; diameter, 2.5 mm. (Dall.)

TYPE in United States National Museum, No. 208558. Type locality, Port Althorp, Alaska, in Granite Cove.

RANGE. Granite Cove, Port Althorp, Alaska.

Lora pribilova Dall, 1919

Proceedings of the United States National Museum, **56**:50; Pl. 16, fig. 2.

Shell white, with a straw-colored periostracum and about six roughly sculptured whorls, the apex eroded; suture distinct, axial sculpture of (on the last whorl 16) rounded narrow riblets crossing the whorls and obsolete on the base; spiral sculpture of (on the spire three, on the last whorl four) prominent rounded cords more or less nodose at the intersections with the ribs, and between the cords two or three fine threads and a few finer striae; the posterior cord forms a shoulder to the whorl; on the canal the cords and threads become more uniform; aperture simple, pillar erased. Height of shell, 12; of last whorl, 8; diameter, 5.5 mm. (Dall.)

TYPE in United States National Museum, No. 225573. Type locality, Cape Lisburne, Arctic Ocean.

RANGE. Cape Lisburne, Arctic Ocean, to Esteros Bay, California.

Lora pitysa Dall, 1919

Proceedings of the United States National Museum, **56**:40; Pl. 16, fig. 7.

Shell small, translucent white, with a one-sided subglobular smooth nucleus of a whorl and a half, and about four subsequent whorls; suture distinct, anal fasciole sloping to a corded shoulder; spiral sculpture begins by two strong cords, one of which marks the shoulder and to these are added by intercalation until the penultimate whorl has four and the last fourteen, not counting the threads on the canal; these are reticulated by axial cords of similar size which do not form ribs or nodes, though the posterior cord at the shoulder is slightly undulated; anal sulcus obscure, aperture simple, inner lip erased, canal short. Height of shell, 5.5; of last whorl, 3.5; diameter, 2 mm. (Dall.)

TYPE in United States National Museum, No. 209851. Type locality, off Point Pinos.

RANGE. Off Point Pinos to San Diego, California.

Lora babylonia Dall, 1919

Proceedings of the Biological Society of Washington, 32:250.

Shell small, whitish, turreted, with about six whorls, the nucleus defective, the suture distinct, not appressed; spiral sculpture of a strong keel at the shoulder and on the base four or five feeble threads, the canal without spiral sculpture; axial sculpture of (on the last whorl about 18) rounded riblets retractive behind the keel, protractive in front of it, straight, forming a nodule at the intersection with the keel and with wider interspaces; aperture short and wide, simple, the anal sulcus coinciding with the end of the keel. Height, 11; diameter, 4 mm. (Dall.)

TYPE in United States National Museum, No. 214192. Type locality, Station 3346, off Tillamook Bay, Oregon, in 786 fathoms.

RANGE. Off Tillamook, Oregon.

Lora maurellei Dall and Bartsch, 1910

Plate 11, fig. 11

Canadian Geological Survey, *Memoranda,* No. 1143, 10; Pl. 1, fig. 5.

Shell small, fusiform, greenish-white, with about six whorls. First whorl of nucleus, flattish, minute, apparently smooth; second whorl with a sharp prominent shoulder-keel, crossed by numerous minute riblets, much lower than the keel. On the next whorl the periphery bears a keel like that at shoulder, and the riblets gradually become stronger, and fewer in number, diminishing, however, on the following whorls to mere axial striations; the peripheral keel also losing its prominence. On the later whorls, which still-preserve, though with less prominence, the keel at the shoulder, the spiral sculpture becomes predominant, and on the spire there are about four spiral threads between the shoulder and the suture in front of it and on the last whorl about ten between the shoulder and the beginning of the canal, which is also spirally striated. The prominent shoulder gives a turreted aspect to the whorls; the aperture being narrow; the outer lip sharp; the anal sulcus shallow and feeble; the pillar white, and attenuated in front; and the canal short and wide. The operculum ovate, somewhat concave with an apical nucleus. Height of shell, 8.5; of last whorl, 5.5; of aperture, 4 mm. (Dall.)

TYPE in United States National Museum. Type locality, Barkley Sound, Vancouver Island, British Columbia.

RANGE. Barkley Sound, Vancouver Island.

Lora grippii Dall, 1908

Plate 7, fig. 6

Nautilus, **21**:137. *Bulletin 112,* United States National Museum; Pl. 3, fig. 3.

Shell small, straw-color or pale brown with occasional spiral bands of darker brown, or all brown; six-whorled, of which the first whorl and a half are white, polished, smooth and turgid, the subsequent portion of the shell having a dull surface; earlier whorls with the periphery nearer the anterior suture, the whorl behind the periphery somewhat flattened and compressed, crossed by low obscure riblets, about a dozen on the fourth whorl, which become obsolete later; the whorl in front of the periphery shows no axial sculpture; the whole whorl is spirally sculptured with narrow sharp incised lines, one dividing the space behind the periphery, and about five in front of the periphery on the penultimate whorl; on the last whorl between the periphery and the siphonal fasciole there are about twelve of these lines, though they probably vary in number with the individual, while the incremental lines are moderately conspicuous; outer lip thin, simple; pillar lips with a small deposit of white callus; aperture narrow, lunate; canal very short, wide, with an inconspicuous fasciole. Length, 9; of spire, 5; of aperture, 4; maximum diameter, 3.5 mm. (Dall.)

Type in United States National Museum. Type locality, off San Diego Bay.

Range. Catalina Island to Todos Santos Bay, Lower California.

Lora pleurotomaria Couthouy, 1838

Boston Journal of Natural History, **2**:107; Pl. 1, fig. 9.

Shell fusiform, elongated, tapering to an acute point, of an uniform dark fawn-color, sutures distinct, whorls seven to nine, covered with rounded undulating ribs or plaits, to the number of eighteen upon the lowest, alternating with each other at the sutures, and most prominent on the superior whorls; in some instances these folds become obsolete about midway on the body-whorl, which is nearly half the length of the shell, with delicate, transverse striae near its middle; in some individuals these striae are apparent on all the whorls; outer lip trenchant, smooth, internally, the edge forming a regular outward curve; a slight compression is perceptible about its middle portion; columella arcuated superiorly, its inferior third inclining, rather abruptly, to the left; aperture an elongated oval, terminating in a brief sub-ascending canal. Long., 16/20; diameter of last whorl, 11/40 in. (Couthouy.)

Type in Boston Society of Natural History. Type locality, Massachusetts Bay, deep water.

Range. Nunivak Island, Bering Sea to Puget Sound. Also Atlantic.

Lora exarata Möller, 1842

Index Molluscorum Grönlandiae, **12.** G. O. Sars, *Mollusca regionis arcticae Norvegiae;* Pl. 16, fig. 18, 1878.

Testa ovato-fusiformi, clathrata; anfr. 6 justa suturam angulatis, longitudinaliter lineis eminentibus cinctus, transversim plicatis; spira breviore. L.4′5‴. (Möller.)

Shell ovate-fusiform, white, latticed; with six whorls angulate to the suture, girdled longitudinally with prominent lines, transversely plicate; with short spire. (Translation.)

TYPE in Zoölogy Museum, Christiania. Type locality, Greenland.

RANGE. Arctic Ocean to Monterey, California, in 581 fathoms. Circumboreal.

Lora tabulata Carpenter, 1865

Plate 7, fig. 13; Plate 18, fig. 5

Annals and Magazine of Natural History, ser. 3, **15**:29. *Proceedings of the United States National Museum,* **56**; Pl. 14, fig. 1, 1919.

M. testa parva, solidissima, luride rufo-fusca, marginibus spirae excurvatis; vertice nucleoso chalcedonico (eroso); anfr. norm. v., postice rectangulatim tabulatis, suturis, impressis; costis radiantibus circ. xvi., valdis, obtusis, circiter basim attenuatam obsoletis; costis spiralibus in spira iii.–iv. angustis. extantibus, supra cost. rad. nodosis; interstitiis alte insculptis, subquadratis; costis circa basim circiter vii., quadratim extantibus, interstitiis a lineis incremeti vix decussatis; canali curta, aperta; labro acutiore, ad angulum posticum vix sinuato; labio tenui; columella obsolete uniplicata. Long., 0.45; long spir., 0.26; lat., 0.2. (Carpenter.)

Shell small, very solid, luridly reddish-tawny, with margins of the spire curved outwardly; with nuclear vertex chalcedonic (eroded); with whorls normally 6 in number, regularly tabulate in the rear with impressed sutures; radial ribs about 16, strong, obtuse, obsolete around the attenuate base; with 3 to 4 spiral costae on the spire, narrow outstanding, nodose above the radial costae; with interstices deeply sculptured, subquadrate; with about 7 ribs around the base, standing out squarely, with interstices scarcely decussate by the lines of growth; with canal short, open; with rather sharp outer lip, scarcely sinuate to the posterior angle; inner lip thin; columella obsoletely uniplicate. (Translation.)

TYPE in United States National Museum. Type locality, Neah Bay, Washington.

RANGE. Sitka, Alaska, to Monterey, California.

Described as *Mangilia tabulata.*

Lora regulus Dall, 1919

Proceedings of the United States National Museum, **56**:48; Pl. 15, fig. 1.

Shell small, white, slender, with predominant spiral sculpture, five whorls, the nucleus eroded; anal fasciole constricted, narrow, the suture inconspicuous, appressed; axial sculpture occasional, faint traces of thread-like obsolete ribs; spiral sculpture of (on the penultimate whorl four or five, on the last whorl about nine) flattish, somewhat undulated spirals with irregular interspaces, usually wider on the last whorl, and on the canal finer, close, spiral threads; aperture narrow, inner lip erased, canal short, slightly recurved. Height of shell, 8; of last whorl, 5; diameter, 3 mm. (Dall.)

Type in United States National Museum, No. 207262. Type locality, off Point Reyes, California, in 61 fathoms.

Range. Known only from the type locality.

Lora miona Dall, 1919

Proceedings of the United States National Museum, **56**:47; Pl. 14, fig. 2.

Shell white, small, roundly shouldered with rather coarse sculpture on the spire, which becomes obsolete on the last whorl; axial sculpture of (on the penultimate whorl 13) rounded irregular ribs with subequal interspaces, the ribs nodulate by the intersection of three or four rather strong spiral cords with narrower interspaces; on the last whorl the ribs are obsolete and the spiral sculpture feebler, flatter, and with occasional intercalary smaller threads; anal fasciole and sulcus obscure, aperture narrow, inner lip erased, canal short. Height of shell, 8; of last whorl, 5; diameter, 3.5 mm. (Dall.)

Type in United States National Museum, No. 252208. Type locality, Boca de Quadra, Alaska.

Range. Boca de Quadra, Alaska, to Point Reyes, California.

Lora fidicula Gould, 1849

Proceedings of the Boston Society of Natural History, **3**: 141. *United States Exploring Expedition;* fig. 284, 1852.

Testa parva, tenuis, albida, longitudinaliter lamelloso, costata, costis viginti-quattuor, striis volventibus ad octo decussatis; spira conica, turrita; anfractibus septem tabulatis, ultimo in rostro brevi subito attenuato: apertura angusta, dimidiam longitudinis testae haud aequanas, postice angulata; labro acuto, crenulato; columella postice arcuata, alba, polita. (Gould.)

Shell small, thin, dirty white, turreted, short fusiform. Surface sculptured with delicate, regular, obtuse, longitudinal rib-folds, about twenty-

four on the last whorl, on the middle of which they disappear, decussated by more crowded, delicate grooves, a little undulating, about eight on the penultimate whorl, cutting the longitudinal ribs, and extending to the origin of the beak, whorls seven, angular, forming a broad shoulder at the suture, which is well-impressed, the last one three-fifths the length of the shell, abruptly forming a short nearly direct beak. Aperture less than one-half the length of the shell, narrow; lip, posteriorly, gently arcuate, sharp, and delicately crimped by the striae; pillar arched retrally, then straight, smoothly rounded, white; interior white. Length of axis 9/20 of an inch; breadth equal to half the length. (Gould.)

TYPE in United States National Museum. Type locality, Puget Sound.

RANGE. Aleutian Islands, to Bellingham Bay, Puget Sound.

Described as *Fusus fidicula.*

Lora tenuicostata M. Sars, 1868

Norske Videnskaps Selskabet Förhandlung, 259. G. O. Sars, *Mollusca regionis arcticae Norvegiae;* Pl. 17, fig. 1, 1878.

Testa tenuis, semipellucida, alba, ovato-fusiformi, subtumidula, spira breviuscula apice obtuso, anfractibus 5 aequaliter convexis, ecarinatis, ultimo spira plus duplo longiore basin versus sensim leviter attenuato, cauda recta, anguste truncata, sutura profunde impressa, apertura oblonga dimidiam testae longitudinem superante, labro externo medio sat arcuato et inflexo, ad suturam sinu profundissimo instructo. Superficies eleganter et subtillissime decussata, plicis longitudinalibus confertissimis, tenuibus, flexuosis, perparum, elevatis, basin versus evanidis, lineisqueve spiralibus subtilibus, subinterruptis sculpta. Long., 10 mm. (M. Sars.)

This species differs from *L. decussata* Couthouy, only in being smaller, with more numerous ribs. (Tryon, *Manual of Conchology.*)

TYPE in Museum Christiania. Type locality, Vadso.

RANGE. St. Lawrence and Nunivak Islands, Bering Sea, to Safly Cove, Alaska. Also Atlantic.

Described as *Bela tenuicostata.*

Lora fiora Dall, 1919

Proceedings of the United States National Museum, **56**:302.

Shell small, grayish white, acute, with a small subglobular nucleus and six subsequent whorls moderately rounded and with a slight shoulder; suture distinct, not appressed; spiral sculpture of (on the penultimate whorl in front of the shoulder about 6) incised lines, with wider interspaces, over-running the ribs; on the last whorl this sculpture extends to the canal; axial sculpture of (on the last whorl about 17) short, rounded

ribs extending from the shoulder, where they are most prominent, over the periphery and obsolete on the base; there are also fairly distinct incremental lines; aperture short, wide, with a feeble anal sulcus and hardly differentiated canal; outer lip thin, simple, inner lip erased; throat whitish. Height of shell, 9.75; of last whorl, 6; of aperture, 4; diameter, 4 mm. (Dall.)

TYPE in United States National Museum, No. 220399a. Type locality, Adakh Island, Aleutians.

RANGE. Adakh Island, Aleutians, to Sitka, Alaska.

Lora lotta Dall, 1919

Proceedings of the United States National Museum, **56**:47; Pl. 14, fig. 4.

Shell small, white, with a pale, straw-colored periostracum, nucleus eroded, four whorls remaining, the general characters resembling those of *L. surana,* but the axial sculpture nearly obsolete, or quite absent from the last whorl, the shoulder less accented, and the canal straighter. Height of shell, 7.5; of last whorl, 6; diameter, 4 mm. (Dall.)

TYPE in United States National Museum, No. 210725. Type locality, Queen Charlotte Islands, British Columbia.

RANGE. Queen Charlotte Islands to San Diego, California.

Lora sixta Dall, 1919

Proceedings of the United States National Museum, **56**:49; Pl. 16, fig. 12.

Shell small, white, with a pale, olivaceous periostracum, of five or more whorls (apex eroded); suture distinct; anal fasciole slightly excavated, sloping to a shoulder; axial sculpture of (on the last whorl about 20) narrow, rounded ribs with subequal interspaces, obsolete on the base, slightly nodulose on the shoulder, supplemented by fine, regular, almost microscopic, incremental lines; spiral sculpture hardly visible on the ribs, of feeble threads with wider, flat interspaces, most evident toward the canal; aperture simple, inner lip erased, canal straight. Height of shell, 8; of last whorl, 6; diameter, 3.5 mm. (Dall.)

TYPE in United States National Museum, No. 209235. Type locality, off San Diego, California, in 640 fathoms.

RANGE. Off San Diego, California, in 359-822 fathoms.

Lora colpoica Dall, 1919

Proceedings of the United States National Museum, **56**:50, Pl. 16, fig. 2.

Shell resembling *L. tenuissima* in sculpture, but shorter, much more distinctly shouldered, and subangulate at the shoulder, with traces of axial

sculpture carried on to the last whorl, but no distinct ribs on the early whorls as in that species. Height of shell, 11; of last whorl, 8.3; diameter, 6 mm. (Dall.)

TYPE in United States National Museum, No. 214193. Type locality, Tillamook, Oregon, in 786 fathoms.

RANGE. Known only from type locality.

Lora tenuissima Dall, 1919

Proceedings of the United States National Museum, **56**:50; Pl. 15, fig. 5.

Shell thin, fragile, acute, whitish, with about six whorls, the nuclear whorl eroded; suture distinct, whorls evenly rounded; spiral sculpture of fine, even, equal, close-set, minute threads covering the whole surface; axial sculpture of almost microscopic, even, regular incremental lines, and on the third whorl about 16 small sharp ribs crossing the whorl, with wider interspaces and becoming obsolete on the fourth whorl; anal sulcus shallow, aperture simple, inner lip erased, pillar attenuated in front, canal short, straight. Height of shell, 15; of last whorl, 11; diameter, 6 mm. (Dall.)

TYPE in United States National Museum, No. 214207. Type locality, Chernoffski Harbor, Unalaska Island, Alaska, in 109 fathoms.

RANGE. Known only from type locality.

Lora casentina Dall, 1919

Proceedings of the United States National Museum, **56**:302.

Shell small, white, with about five whorls, the nucleus decorticated, the whorls with a subangular shoulder in front of the anal fasciole; axial sculpture of (on the penultimate whorl about 20) low, thread-like ribs extending from the shoulder to the succeeding suture, but more or less obsolete on the last whorl; spiral sculpture of faint feeble striae on the fasciole, in front of the shoulder of numerous close-set flattish small threads, extending uniformly to the canal; anal sulcus shallow; outer lip slightly arcuate, inner lip erased; pillar short, straight; canal hardly differentiated. Height of shell, 9; of last whorl, 7; diameter, 5 mm. (Dall.)

TYPE in United States National Museum, No. 209257. Type locality, Station 4538, off Point Pinos Light, Monterey Bay, California.

RANGE. Off Point Pinos, California, in 871 fathoms.

Lora galgana Dall, 1919

Proceedings of the United States National Museum, **56**:303.

Shell white, under a yellowish periostracum, of six or more obtusely shouldered whorls, the apex decorticated, the suture appressed; axial

sculpture on the earlier whorls of about 18 protractively oblique rounded ribs, slightly angulated at the shoulder, feeble on the fasciole and crossing the whorls except on the last whorl where they gradually become obsolete; the whole surface is spirally sculptured with fine close-set threads; here and there one a little more prominent than the rest, others near the canal coarser; anal sulcus wide and shallow; outer lip arcuate, inner lip erased; canal moderately long, slightly recurved. Height of shell, 15; of last whorl, 11; diameter, 6 mm. (Dall.)

TYPE in United States National Museum, No. 214173. Type locality, Station 3330, Bering Sea, north of Unalaska, in 351 fathoms.

RANGE. Unalaska, Aleutian Islands, in 351 fathoms.

Lora harpa Dall, 1884

Proceedings of the United States National Museum, **7**:532; **9**; Pl. 4, fig. 2, (1886).

Shell fusiform, moderately thin, six whorled; whorls rounded, suture distinct; sculpture consisting of (on the last whorl) 23 stout, uniform, slightly flexuous rounded ribs extending from the suture to the canal with slightly narrower interspaces; lines of increase distinct; sometimes thread-like; these are crossed by numerous close-set spiral threads; separated by narrow grooves, both faint near the suture; threads growing stronger, regularly wider, and coarser gradually toward the canal, near which they are stronger than the obsolete ends of the transverse ribs; anal fasciole (notch band) indistinct, aperture narrow, elongated with an acute posterior angle, outer lip thin, columella simple, canal rather wide; shell whitish, with a reddish tinge anteriorly, especially on the last whorl; interior of aperture reddish, of the canal pure white. Long. of shell, 17; of last whorl, 12.5; of aperture, 10; lat. of shell, 8; of aperture, 3.5 mm. (Dall.)

TYPE in United States National Museum, No. 40959. Type locality, Nunivak Island, Alaska.

RANGE. Arctic Ocean, Queen Charlotte Islands; circumboreal.

Lora albrechti Krause, 1885

Plate 11, fig. 5

Archiv für Naturgeschichte, **51**:276; Pl. 18, figs. 3, 11.

Testa fusiformis, subtenuis, alba epidermide flavescenticenera, anfractibus quinque aequaliter convexis, ultimo spira duplo longiore, sutura distincta, apertura late aperta, dimidiam testae longitudinem aequante, labro externo ad suturam distincte emarginato deinde aequaliter arcuato. Superficies lineis confertis spiralibus anguste impressis et longitudinalibus paulo magis conspicuis subtiliter reticulata; operculum forma solida. Long., 10; lat., 5 mm. (Krause.)

Shell fusiform, rather thin, white, with epidermis yellowish-ashy, with five equally convex whorls, with spire longer than twice the last, with distinct suture aperture widely open, equaling half the length of the shell, with outer lip distinctly emarginate to the suture, and thence equally arcuate. Surface obscurely reticulated with crowded spiral lines narrowly impressed and with longitudinal lines a little more conspicuous; operculum of the usual form. (Translation.)

TYPE in Stuttgart Royal Cabinet. Type locality, Plover Bay, Bering Strait.

RANGE. Plover Bay, Bering Strait to Port Etches, Alaska.

Described as *Bela albrechti.*

Lora krausei Dall, 1886

Plate 7, fig. 7

Proceedings of the United States National Museum, 9:301; Pl. 4, fig. 4.

Shell small, elongate, ovate, compressed, with about six whorls and a rather large smooth nucleus; transverse sculpture of, on the last whorl, about 26 broad flattened waves, strongly flexed, most elevated over the fasciole, and becoming narrower and less prominent anteriorly; the outer angle of the anal notch is rather prominent and makes an angulation especially of the earlier whorls, which fall away in a peculiarly flattened manner to the suture; longitudinal sculpture of fine sharp grooves, which pass uniformly over the ribs and interspaces, are somewhat stronger on the earlier whorls and very uniform, only a little coarser on the canal. The notch is more marked than usual in *Bela*; the shell is pure white and the epidermis grayish yellow and quite strong. Length of shell, 9; of aperture, 4.7; width of shell, 2.3 mm. (Dall.)

TYPE in United States National Museum. Type locality, Port Etches, Alaska.

RANGE. Known only from type locality.

Lora lütkeni Dall, 1919

Proceedings of the United States National Museum, 56:49; Pl. 16, fig. 5.

Shell small, white, with a minute smooth nucleus and five subsequent whorls; suture distinct, anal fasciole narrow, constricted, obscure; axial sculpture of (on the last whorl 26) narrow well-defined ribs, slightly peripherally prominent on the early whorls, with narrower interspaces, extending from suture to suture and on the last whorl to the canal, slightly protractively arcuate; there are also fine, regular, incremental lines; spiral sculpture of numerous fine sharp striae with subequal interspaces, which

groove the surface of the ribs and become threadlike on the canal; aperture narrow, inner lip erased, canal short. Height of shell, 8; of last whorl, 5; diameter, 3 mm. (Dall.)

TYPE in United States National Museum, No. 220305. Type locality, Port Etches, Alaska.

RANGE. Known only from type locality.

Lora lutkeana Krause, 1885

Plate 11, fig. 10

Archiv für Naturgeschichte, **51**:281; Pl. 18, figs. 6, 16.

Testa ovato-fusiformis, brunnea, anfractibus circiter sex contabulatis, supra juxta suturam vix angulatis. Superficies lineis spiralibus numerosis et plicis longitudinalibus 18–20 parum prominulis, linea longitudinali quasi dimidiatis, in anfractu ultimo caudam attingentibus obducta. Long., 12; lat., 6; alt., 5.5 mm. (Krause.)

Shell ovate-fusiform, brownish, with about six tabulate whorls with the spire scarcely angulate next to the suture. Surface with numerous spiral lines and 18–20 spiral plications, little prominent divided as it were in the middle above a longitudinal line and reaching the line in the last whorl. (Translation.)

TYPE in Stuttgart Royal Cabinet. Type locality, St. Lawrence Bay, Bering Strait.

RANGE. Known only from type locality.

Described as *Bela lutkeana.*

Lora incisula Verrill, 1882

Catalogue of the Marine Molluscs of New England, 461; Pl. 43, fig. 12; Pl. 57, fig. 14.

The shell is small, subfusiform to short ovate, with about five or six turreted flattened whorls, which are angularly shouldered just below the suture. The subsutural band arises abruptly from the suture, nearly at right angles, and its surface is flat and slightly concave, marked by strongly recurved lines of growth but mostly without spiral lines. The shoulder is often nearly right-angled. The whorls are decidedly flattened in the middle. There are on the last whorl, about twenty rather broad, flattened or rounded ribs, which are nearly straight, a little prominent and usually slightly nodose at the shoulder, but they disappear a short distance below it. They are separated by well-excavated, concave grooves, deepest close to the shoulder. The most characteristic feature of the sculpture is that the surface is marked by rather fine, but regular and distinct, sharply incised, narrow revolving grooves, which are rather distant, with flat

intervals. Of these there are usually about three to five on the penultimate whorl, and about twenty to twenty-eight on the last, the greatest number being below the middle, on the siphon, where they become coarser and closer, with narrower rounded intervals. One of the sulci just below the shoulder is usually more distinct, and cuts the tips so as to give their upper ends a subnodulous appearance; below this there is usually a rather wide zone, without grooves, usually no revolving lines above the shoulder. The apex is usually eroded; when perfect it is smooth. The nucleus has a very small and slightly prominent smooth apex; its first turn is marked with fine spiral lines; the next whorl has, at first, about three stronger spiral raised cinguli, which soon begin to be crossed by thin transverse riblets. Aperture about half the length of the shell, narrow ovate, or elliptical, angulated above. Canal short, nearly straight, a little narrowed at the base by an incurvature of the lip. The outer lip has a decided angle at the shoulder, below which the edge is well-rounded, and projects strongly forward, in the middle; the sinus, above the shoulder, is rather deep, wide, and evenly rounded within. Columella strongly excavated in the middle, obliquely receding at the end. The shell is commonly greenish-white and covered by a thin, close, greenish epidermis; but some specimens are clear white, and rarely pinkish. Long., 6.5; breadth, 3.5; aperture, 3 mm. (Verrill.)

TYPE in ? Type locality, Labrador.

RANGE. St. Lawrence Bay, Bering Strait. (Krause.) Also Atlantic.

This is one of the most common and widest distributed species of the *Bela* found on the New England coast. (Verrill.)

Described as *Bela incisula*.

Lora nobilis Möller, 1842

Plate 7, fig. 9

Index Molluscorum Grönlandiae, 12. G. O. Sars, *Mollusca regionis arcticae Norvegiae;* Pl. 16, figs. 19, 20, 1878.

Testa ovato-fusiformi, alba; anfr. 6 juxta suturam angulatis, longitudinaliter lines impressis cinctis, transversim costulatis; spira elata, breviore quam venter. L. 7.5‴. (Möller.)

Shell ovate-fusiform, white, whorls six in number angulated at the suture, longitudinally girdled with impressed lines transversely costulate; spire elevated, shorter than the venter. (Translation.)

TYPE in Zoölogy Museum, Christiania. Type locality not known to writer.

RANGE. Arctic Ocean, Bering Sea, off Akutan Pass, in 60 fathoms. Circumboreal.

Lora metschigmensis Krause, 1885

Plate 11, fig. 13

Archiv fur Naturgeschichte, **51**:276; Pl. 18, figs. 2, 10.

Testa ovato-fusiformis, carnea, anfractibus 5–6 planulatis juxta suturam obtuse angulato-carinatis; apertura ovali, dimidiam testae longitudinem aequante. Superficies cingulis spiralibus planis et plicis longitudinalibus obliquis paulo magis conspicuis in carina nodulosis, basin versus evanidis, regulariter decussata; pars infra carinam lineis spiralibus magis confertis obducta, plicis longitudinalibus ibi obsoletis. Long., 11; lat., 5.4 mm. (Krause.)

Shell ovate-fusiform, flesh-colored, with 5–6 whorls flattened to the suture and obtusely angulate-carinate; with oval aperture half the length of the shell. Surface with flattened spiral zones and longitudinal oblique plications a little more distinct, nodulous on the carina, disappearing toward the base, regularly decussate; that part below the carina covered with less crowded spiral lines, with the longitudinal plications obsolete there. (Translation.)

Type in Stuttgart Royal Cabinet. Type locality, Metchigme Bay, Bering Strait.

Range. Known only from type locality.

Described as *Bela metschigmensis.*

Lora bicarinata Couthouy, 1838

Boston Journal of Natural History, **2**:104; Pl. 1, fig. 11.

Shell fusiform, turreted, color an uniform dark brown; whorls, six, convex, having numerous slightly elevated, revolving ribs, with intervening striae upon the lowest, and impressed in their middle portion by a deep sulcus, which forms a distinct revolving carination upon each side of it; sutures clearly defined; body-whorl half the entire length of the shell; striae of growth, minute; outer lip thin, sub-arcuated, serrated on its margin by the terminating striae; the sinus at its juncture angular, very slight, and hardly amounting to a fissure; columella arcuated at its superior third; aperture elliptical, terminated by a short canal slightly inclining to the left. Long., 11/40; diameter of last whorl, 2/40 in. (Couthouy.)

Type in Cabinet of Boston Society of Natural History. Type locality, east of Nahant, from the stomach of a haddock.

Range. Point Belcher, Arctic Ocean, to Puget Sound. Circumboreal.

Lora bicarinata exserta Aurivillius, 1885

Vega Expeditionens Vetenskalpliga Iakttagelser, **4**: 376.

Anfractibus 5½, canali quam in "bicarinata" longiore anfractu ultimo sulcis et costis spiralibus sat distinctis, intercostam maximam (posticam)

et suturam tenuissime et creberrime sulcato; anfractibus omnibus ultimo excepto ante medium costis longitudinalibus conspicuis. Long., 12; lat., 5; alt. aperture, 6.5; lat. of aperture, 2 mm. (Aurivillius.)

Whorls 5½ in number, canal longer than in *bicarinata,* last whorl with quite distinct sulci and costae, most slenderly and frequently sulcate at the suture and the largest (posterior) intercostal; with all the whorls except the last with conspicuous longitudinal costae in front of the middle. (Translation.)

TYPE in Museum, Stockholm? Type locality, Arctic.

RANGE. Arctic Ocean, north of Bering Strait.

Lora elegans Möller, 1842

Index Molluscorum Grönlandiae, **13.**

Testa fusiform, tereti, nivea, laeviori; anfr. 7 juxta suturam obsolete angulatis, longitudinaliter subtillissime striatis, transversim costulatis; spira acuminata. L. 5.5‴. (Möller.)

Shell fusiform, rounded, snow-white, very smooth; 7 whorls obsoletely angulate next the suture, longitudinally very finely striate, transversely costulate; acuminate spire. (Translation.)

TYPE in Zoölogy Museum, Copenhagen. Type locality not known to writer.

RANGE. Blizhni Islands to St. Lawrence Island, Bering Sea. Circumboreal.

Lora novaiasemliensis Leche, 1878

Konglige Svenska Vetenskaps Akademie, Handlinger, **16:** 58; Pl. 1, fig. 15.

Testa ovato-fusiformi, cinereo-lutae; anfractibus 5½–6, planiusculis, juxta suturam recte angulatis, longitudinaliter et transversim aequaliter lineatis; canali brevi. Long., 8; lat., 4½; alt. anfr. ult., 4½; apert., 4 mm. (Leche.)

Shell yellowish-ash color; finely and equally decussated by longitudinal revolving lines; whorls with a narrow shoulder. (Tryon, *Manual of Conchology.*)

TYPE in Academy of St. Petersburg? Type locality, Arctic Ocean.

RANGE, Kara Sea, Arctic Ocean, to north of Bering Strait.

Lora woodiana Möller, 1848

Index Molluscorum Grönlandiae, **13.**

Testa ovato-fusiformi, cinereo-rosea, obsolete clathrata; anfr. 6 juxta suturam rotundato-angulatis, longitudinaliter lineis eminentibus cinctis, transversim plicatis; spira breviore. L. 6‴. R (Möller.)

Shell ovate-fusiform, ashy-rosy, obsoletely latticed; with six whorls rotund-angulate next to the suture, longitudinally girdled with high lines transversely plicate; with rather short spire. (Translation.)

TYPE in Copenhagen. Type locality, Arctic.

RANGE. White Island, Arctic Ocean, to north of Bering Sea.

Lora harpularia Couthouy, 1838

Boston Journal of Natural History, **2**:106; Pl. 1, fig. 10.

Shell oblong, fusiform, turreted; color, yellowish-brown; whorls, 6–8, convex, slightly angular superiorly, and planulated at the suture, which is clearly defined; they are traversed by numerous, oblique, rounded ribs, to the number of 19 on the body-whorls, whose interstices are filled with delicate but distinct, transverse striations, extending nearly across the ribs; aperture elongated, oval, rendered somewhat angular at the outer, superior extremity by the planulation of the body-whorl; lip sharp and smooth internally; columella smooth, arcuated, with a slight callus upon its inferior portion; canal short and inclined to the left. Long., 11/20; diameter of last whorl, 5/12 in. (Couthouy.)

TYPE in Boston Society of Natural History. Type locality, from a cod taken off Phillips' Point, Lynn, Massachusetts.

RANGE. Point Belcher, Arctic Ocean, to Puget Sound. Circumboreal.

Lora nazanensis Dall, 1919

Proceedings of the United States National Museum, **56**:45; Pl. 15, fig. 8.

Shell short-fusiform, white with a brown band in front of the suture and another on the base, or all white with about five whorls and a very small blunt nucleus, suture distinct, whorls moderately rounded; axial sculpture of (on the penultimate whorl about 25) narrow, crowded, sigmoid ribs not passing the periphery but extending from the preceding suture with narrower interspaces; spiral sculpture of narrow grooves with wider interspaces, more close toward the base and on the spire cutting the summits of the ribs; aperture simple, pillar white, erased; canal short, straight. Height of shell, 11; of last whorl, 8; diameter, 5.5 mm. (Dall.)

TYPE in United States National Museum, No. 220327. Type locality, Nazan Bay, Atka Island, Aleutian Islands.

RANGE. Norton Sound, Alaska, to Aleutian Islands.

Lora mörchi Leche, 1878

Konglige Svenska Vetenskaps Akademie, Handlinger, **16**: 57; Pl. 1, fig. 18.

Att ej föreliggande form utan den följande (se nedan) är "Pl. gigas Beck Pl. violacea Migh. et ad, var. gigantea Mörch," af hvilken Mörch

beskrifvit ett exemplar från Spetsbergen, derom har jag genom jemförelse med originalex, öfvertygat mig. Dr. Mörch ansåg äfven de föreliggande ex. höra till Beck's "Pl. gigas"; en blick på medföljande afbildningar (f, 18 och 10) torde dock öfvertyga om, att de äro skiljaktiga, något som för resten redan framgär ur en jemförelse af Mörch's och Verkrüzen's diagnoser Deremot öfverensstämmer Verkr's beskrifning afbildning af hans "Pl. gigas" från Vadso nästan fullständigt med de föreliggande så att jag med uteslutande af några oväsentliga karakterer, hvilka torde vara individuela variationer, kan återge hans diagnos, säsom likaledes gallande för de ifragavarande ex.: Testa ovata, sub epidermide albida, longitudinaliter rugoso-striata et spiraliter striolata, olivaceo-livida; spira conica, anfra. 5 rotundati, superne subplani, sutura vix impressa, apertura subampla intus violacea, columella superne curvata, violacea, basi oblique truncata, alba, cauda nulla; labrum tenue, actum. Den enda nämnvärda skiljaktiget mellan Verkr's och föreliggande ex. är, att å de förra finnes på midten af columella en hvitfläckig callus-bildning, till hvilken endast otydliga spär synas hos ex. från N. Semlja. Helt säkert är denna form nära beslägtad med Midd.'s "Pl. simplex" (*Beiträge,* etc., 11: pag.448), hvilken art jag dock känner endast efter Midd.'s beskrifning och afbildning. Long., 14½; lat., 7½; anfr. ult., 10; alt. apert. 9½ F. (Leche.)

By comparison with the original I have convinced myself that the present species is not *Pl. gigas* Beck, *Pl. violacea* Migh. *et var gigantea* Mörch, one example of which, from Spitzbergen, Mörch has described. Dr. Mörch considers the present specimen as belonging to Beck's *Pl. gigas;* a glance at the accompanying illustrations (figs. 18 and 10) ought to convince one that they are different, something that also appears by a comparison of Morch's and Verkruzen's diagnosis. On the other hand, Verk's description, illustration of his *Pl. gigas* from Vadso, corresponds almost completely with the present specimen, so that, disregarding some insignificant characteristics which ought to be individual variations, I can reproduce quite his diagnosis, as being true, likewise applicable to the specimens in question: (*Testa acutum*). The only difference of note between Verk's and the present specimen is, that upon the former there is found on the middle of the columella a white-spotted exuberance of which only faint traces appear on the specimen from Novaja Semlja. In all probability this form is closely related to Midd's *Pl. simplex* (B———), which species I know, however, only by Midd's description and illustration. (Translation.)

TYPE ? Type locality not known to writer.

RANGE. Blizhni Islands to St. Lawrence Island, Bering Sea.

Lora surana Dall, 1919

Proceedings of the United States National Museum, **56**:45; Pl. 14, fig. 6.

Shell thin, white, small, with about six whorls, the nucleus defective, the suture distinct; anal fasciole extending from suture to a cord which forms a shoulder to the whorl, retractively loop-wrinkled; axial sculpture in front of the shoulder of numerous, low, narrow, sigmoid riblets with sub-equal interspaces, obsolete on the base, on the spire crossing the whorls; spiral sculpture of somewhat unequal flattish threads with equal or wider interspaces, crossing the shell, not nodulous at the intersections; aperture simple, canal short, twisted, developing an evident siphonal fasciole; operculum normal. Height of shell, 9; of last whorl, 6; diameter, 4 mm. (Dall.)

TYPE in United States National Museum, No. 206590. Type locality, off Point Sur, California.

RANGE. Off Point Sur and Point Pinos, California, in 292–398 fathoms.

Lora monterealis Dall, 1919

Proceedings of the United States National Museum, **56**:46; Pl. 15, fig. 9.

Shell very similar to *L. surana,* but larger, with the same number of whorls, the ribs less numerous, more emphatic, with wider interspaces, and a less conspicuous cord at the shoulder. Height of shell, 12; of last whorl, 8; diameter, 5.3 mm. (Dall.)

TYPE in United States National Museum, No. 226160. Type locality, Monterey Bay, California, in 581 fathoms.

RANGE. Known only from type locality.

Lora diegensis Dall, 1919

Proceedings of the United States National Museum, **56**:46; Pl. 16, fig. 10.

Shell white with a pale brownish periostracum and five shouldered whorls, the nucleus eroded; suture distinct, anal fasciole narrow, spirally threaded, bounded in front by the angle of the shoulder; spiral sculpture of on the spire three to five subequal cords with equal interspaces, on the last whorl about 14, slightly swollen at the intersections; axial sculpture of (on the penultimate whorl about 24) cord-like riblets, beaded at the shoulder, obsolete on the base, the rectangular interstices marked; aperture simple, pillar erased, attenuated in front, canal well-marked, straight. Height of shell, 8.5; of last whorl, 6; diameter, 4 mm. (Dall.)

TYPE in United States National Museum, No. 209421. Type locality, off San Diego, California.

RANGE. Off La Jolla, California, to Cape San Quentin, Lower California.

Lora amiata Dall, 1919

Proceedings of the United States National Museum, **56**:303.

Shell elevated, rugose, white under a pale yellow periostracum, with six subtabulate whorls, the nucleus decorticated, suture obscure, closely appressed; spiral sculpture of an angle at the shoulder, between which and the suture are four or five close-set small equal threads; in front of the shoulder is a constriction beyond which are about a dozen deep grooves with wider, rounded interspaces, which are finely spirally striated; on the canal there are crowded small threads; axial sculpture of about 15 short ribs extending from the shoulder, which they nodulate, to the periphery only; aperture narrow, with a shallow anal sulcus; outer lip thin, inner lip erased, canal straight and short. Height of shell, 15; of last whorl, 10.5; of aperture, 8; diameter, 7 mm. (Dall.)

TYPE in United States National Museum, No. 214219. Type locality, Belkoffski, Alaska.

RANGE. Known only from type locality.

Lora turricula Montagu, 1803

Testacea Britannica, 262; Pl. 3, fig. 17.

Shell with seven taper-ribbed spires, of a white color, and somewhat glossy, terminating in a fine point, and striated transversely: the volutions are strongly defined, not rounded, but rise perpendicularly above each other, the top of each being almost flat; the ribs at that part angulated, or turreted, and suddenly decline to the separating line: aperture narrow-oblong, ending in a broad canal; outer lip a little thickened by a rib; upper part angulated; pillar lip smooth. Length, ¾; breadth, rather more than ¼ in. (Montagu.)

TYPE in Museum Macgillivray. Type locality, Sandwich, Kent.

RANGE. Icy Cape, Arctic Ocean, to Puget Sound, Bristol Channel, western and eastern parts of England and Wales, on all the Irish, Scotch, and Icelandic coasts.

Lora pavlova Dall, 1919

Proceedings of the United States National Museum, **56**:43; Pl. 14, fig. 9.

Shell white, thin, and delicate, with six or more whorls, the nucleus eroded; spiral sculpture of fine striae with wider flat interspaces minutely cut into segments by close regular incremental lines, whorls subangulate at the shoulder; axial sculpture of sharp, sigmoid riblets (22 or more on

the penultimate whorl) obsolete on the base and most of the last whorl; anal sulcus wide, shallow; aperture simple, inner lip erased. Height of shell, 18.5; of last whorl, 12.5; diameter, 9 mm. (Dall.)

Type in United States National Museum, No. 226200. Type locality, Station 3607, off Pribilof Islands, Bering Sea, in 987 fathoms.

RANGE. Off Pribilof Islands, Bering Sea.

Lora alitakensis Dall, 1919

Proceedings of the United States National Museum, **56**:43; Pl. 14, fig. 7.

Shell thin, pale-yellowish, with touches of reddish-brown on the prominences, with about six whorls, the nucleus eroded, the suture distinct; axial sculpture of (on the last whorl 14) sigmoid ribs which cross the whorls and reach the canal with subequal interspaces; spiral sculpture with narrow channeled grooves with wider flattish interspaces often divided by a central feebler groove; these cover the whole surface; aperture simple, inner lip erased, white; canal short, very slightly recurved. Height of shell, 20; of last whorl, 14; diameter, 9 mm. (Dall.)

TYPE in United States National Museum, No. 222088. Type locality, Unimak Island, Alaska.

RANGE. Unimak Island, Aleutians, to Alitak Bay, Kodiak, Alaska.

Lora solida Dall, 1886

Proceedings of the United States National Museum, **9**:301; Pl. 3, fig. 4.

Shell solid, short, stout, with five strongly sculptured whorls and a small smooth nucleus; color a faint blush of salmon covering the white; epidermis very thin, smooth, and adherent; transverse sculpture of, on the last whorl, thirteen, stout, shouldered, prominent, rather sharply rounded ribs, which pass over the periphery and disappear at the anterior third of the whorl; they cross the anal fasciole with but little flexure, but curve forward from the angulation (generally more decidedly than the figure indicates), at which they are somewhat swollen, with about equal interspaces; longitudinal sculpture of numerous equal uniform grooves, with convexly rounded subequal interspaces, faint on the anal fasciole, but covering the rest of the shell with remarkable uniformity, averaging five or six to the space of a millimeter; one or two stronger ones follow the angulation of the whorl, but not prominently; pillar stout, white; anal notch obsolete; operculum short, broad, thin, yellowish. Length of shell, 13; of aperture, 8; breadth, 7 mm. (Dall.)

TYPE in United States National Museum. Type locality, Harbor of Kyska, Alaska.

RANGE. Bering Sea to Puget Sound.

Lora popovia Dall, 1919

Proceedings of the United States National Museum, **56**:42; Pl. 14, fig. 8.

Shell white with straw-colored periostracum, six shouldered whorls, a subglobular small nucleus, and distinct suture; spiral sculpture of (on the upper whorl, four or five) rounded threads, between the shoulder and the succeeding suture, the threading obsolete on the last whorl or reduced to fine striation on the base and canal; axial sculpture on the spire of about 16 short rounded ribs swollen at the shoulder and reaching the succeeding suture, but fainter on the last whorl and absent from the base; aperture simple, pillar white, erased, canal short, straight. Height of shell, 13; of last whorl, 8; diameter, 5.5 mm. (Dall.)

TYPE in United States National Museum, No. 220883. Type locality, Bristol Bay, Bering Sea.

RANGE. Bristol Bay, Bering Sea, to Point Pinos, California.

Lora rassina Dall, 1919

Proceedings of the United States National Museum, **56**:303.

Shell small, white, with a small (decorticated) nuclear whorl and five subsequent, slightly shouldered whorls; suture distinct, not appressed; axial sculpture of (on the last whorl about 20) narrow, rounded ribs extending from the suture over the periphery but more or less obsolete on the base, the interspaces wider; spiral sculpture of numerous, close-set, rounded threads over the whole surface but not nodulating the ribs; anal sulcus very shallow, outer lip thin, nearly straight, inner lip erased, canal very short, hardly differentiated from the aperture. Height of shell, 10; of last whorl, 7; diameter, 5.5 mm. (Dall.)

TYPE in United States National Museum, No. 214224. Type locality, Station 3305, Bering Sea.

RANGE. Off Bristol Bay, Bering Sea.

Lora rugulata spitsbergensis Friele, 1886

Plate 7, fig. 10

North Atlantic Expedition Reports, **2**:3; Pl. 7, figs. 3, 4.

Formen og Forholdet imellem Spir og Mundaabning er typisk. 1 Skulpturen afviger næværende Varietet ved en stærkere fremtrædende Kjo; der kan gaa over til en skarp fremtrædende Kant (fig. 4) og en noget kraftigere Spiralstrieng.

Storrelse: Axiallægde, 19; Diameter, 10 mm. (Friele.)

The form and the relation between spire and aperture is typical. In sculpture, this variety differs by a more pronounced keel, which can

change into a sharply marked edge (fig. 4) and a somewhat stronger spiral line. Size: axial length, 19; diameter, 10 mm. (Friele.)

TYPE in Museum Christiania. Type locality, Magdalene Bay (Spitzbergen=Svarlbard), 40–50 fathoms.

RANGE. Plover Bay to Port Althorp, Alaska.

Lora tenuilirata Dall, 1871

American Journal of Conchology, **7**: 98. *Proceedings of the United States National Museum,* **56**; Pl. 15, fig. 4.

Shell pure white, with distinct revolving lines decussated by regular lines of growth. (Dall.)

TYPE in United States National Museum. Type locality, Norton Sound, Alaska, at the Fort of St. Michael on the beach, dead, in very large numbers, and alive among stones at low water.

RANGE. Point Barrow, Arctic Ocean, to Shumagin Islands, Alaska.

Lora tenuilirata cymata Dall, 1919

Proceedings of the United States National Museum, **56**:42; Pl. 16, fig. 4.

Shell resembling typical *tenuilirata,* but with a higher and more acute spire, and with twenty or more narrow axial riblets on the last whorl, obsolete on the base, and a single spiral thread at the shoulder. Height 23; of last whorl, 17; diameter, 10.5 mm. (Dall.)

TYPE in United States National Museum, No. 226186. Type locality, Nunivak Island, Bering Sea.

RANGE. Nunivak Island, Bering Sea, to Shumagins.

Lora healyi Dall, 1919

Proceedings of the United States National Museum, **56**:42; Pl. 16, fig. 8.

Shell white, more or less discolored by ferruginous red (probably adventitious) with five and a half rounded whorls, a subglobular smooth nucleus forming one and a half of these; spiral sculpture of (on the penultimate whorl 6 or 7, on the last whorl about 14) coarse rather irregular cords with narrower channeled interspaces, the cords more or less nodulated by incremental lines and on the spire by obscure ribbing; suture distinct, aperture narrow, simple; pillar white, erased, canal short, straight. Height of shell, 15; of last whorl, 10; diameter, 7 mm. (Dall.)

TYPE in United States National Museum, No. 223908. Type locality, Arctic Ocean north of Bering Sea.

RANGE. Known only from type locality.

Lora murdochiana Dall, 1919

Proceedings of the United States National Museum, 7:524; Pl. 2, fig. 8.

Shell whitish, short, stout, with rather coarse sculpture and very short spire, whorls about five, the last much the largest; whorls inflated, suture deep, almost channeled, sculpture of numerous (on the last whorl about two to the millimeter) narrow, backwardly convex, flexuous riblets with about equal interspaces, strongest near the suture, not crossing the fasciole and obsolete near the periphery; lines of growth distinct, crossed by numerous (about six to the millimeter) rather coarse threads, of which each alternate one tends to be smaller, separated by narrow grooves and about uniformly distributed over the surface, with a tendency to a faint carina in front of the indistinct fasciole; outer lip sharp, columella simple, white; aperture pinkish, canal short, wide; nuclear whorls eroded in the specimens; operculum light horn color, rather broad and short. Long. of shell, 11.5; of last whorl, 10; max. lat. of shell, 8.5 mm. (Dall.)

TYPE in United States National Museum, No. 40960. Type locality, Cape Smythe, Arctic.

RANGE. Point Barrow, Arctic Ocean, to Pribilof Islands, Bering Sea.

Lora chiachiana Dall, 1919

Proceedings of the United States National Museum, 56:43; Pl. 14, fig. 7.

Shell olive brown, with five whorls, the nucleus eroded, suture distinct; upper whorls with about 16 axial, rather rude, roughly sigmoid riblets crossing the whorls, obsolete on the latter half of the shell, the incremental lines irregular; spiral sculpture of almost obsolete fine spiral striae most evident on the last whorl, the interspaces flattish, wider, subequal; aperture brownish, simple, pillar white, canal slightly recurved. Height of small, 20; of last whorl, 14; diameter, 9 mm. (Dall.)

TYPE in United States National Museum, No. 206207. Type locality, Chiachi Islands, Aleutian.

RANGE. Arctic Ocean to Chiachi Islands and Port Althorp, Alaska.

Lora mitrata Dall, 1919

Proceedings of the United States National Museum, 56:43; Pl. 16, fig. 1.

Shell resembling *tenuilirata cymata,* but with sharper sculpture, higher spire, shorter aperture, more gyrate pillar, and darker color, especially on the keel at the shoulder. Height of shell, 24; of last whorl, 16; diameter, 11 mm. (Dall.)

TYPE in United States National Museum, No. 87857. Type locality, Port Clarence, Bering Strait.

RANGE. Bering Strait to Shumagin Islands, Alaska.

Lora rosea M. Sars, 1846

Lovèn, *Index Molluscorum Scandinaviae,* 12. G. O. Sars, *Mollusca regionis arcticae Norvegiae;* Pl. 23, fig. 10.

Testa fusiformis, graciliuscula, rufa, cancellata costis circ. 13, apertura dimidiam longitudinem aequante. Priore gracilior; anfr. 6–7 convexi, tumiduli, postice angulati, planulati, cingulis obducti, pone angulum tenuissimis, in medio anfr. majoribus, interpostis hic et illic tenuiorbis; costae validae, elevatae, postice subsigmoideae, in angulo subnodosae, in cauda evantae; autura profunda; apertura angusta, margine columellari postice vix sinuato, canali lato, subcompresso; labrum album acutum, postice ad angulum sinuatum; fauces obscure fuscae; 10.4; 5.2 mm. Differt a "T. harpulario" forma graciliore, anfr. magis tumidis, sutura profundiore, costis multo validioribus. (M. Sars.)

Shell fusiform very slender, reddish, cancellate with about 13 costae, aperture equal to half the length, more slender than the former (species); whorls 6–7 convex, slightly tumid, in the rear angulate, flattened, prolonged in zones, very slender behind the angle, stronger in the middle of the whorl, with more slender lines intercalated here and there; costae strong, elevated, subsigmoidal behind, subnodose on the angle, disappearing on the tail; suture deep; aperture narrow, columellar margin in the rear scarcely sinuate; basal canal, subcompressed. Outer lip white, acute, in the rear sinuate to the angle; throat obscurely dusky. Differs from *T. harpularia* in the more slender form, in the more tumid whorls, deeper suture, and much stronger costae. (Translation.)

Type in Museum Christiania. Type locality, Arctic?

Range. Simeonoff Island, Shumagins, to San Juan Islands, Washington.

Described as *Bela harpularia rosea.*

Lora simplex Middendorff, 1849

Beitrage zu einer Malocologia Rossica, 2:119. *Sibirische Reise;* Pl. 12, figs. 15, 16, 1850.

Testa fusiformi, calcarea, intus violaceo-coerulea; anfractibus applanatis, laevigatis; sutura distincta, canaliculata; columella subcallosa, applanata; labro simplici acuto; apertura supra vix incisa, semilunari; canali brevi. Long., 1; lat., ½–1; anfr. ult., ½–1/10. (Middendorff.)

Shell fusiform calcareous, within violet-bluish; with flattened whorls, smoothed; suture distinct, canaliculate; columella subcalloused, flattened; outer lip simple, acute; aperture above scarcely incised similunular; canal short. (Translation.)

Type in Academy of St. Petersburg. Type locality, Okhotsk Sea.

RANGE. Point Barrow, Arctic Ocean, to Pribilof Islands and the Okhotsk Sea.

Lora laevigata Dall, 1871

American Journal of Conchology, 7:98; Pl. 16, fig. 7.

Shell short, stout, of four or five robust whorls, smooth, or with excessively fine revolving lines; spire short, usually one-third or less of the total length, but varying somewhat; suture distinct but not channeled, whorls not turreted, apex rather obtuse, nucleus minute, whitish, smooth of a whorl and a half; aperture about two-thirds as long as the shell, wide; outer lip effuse, sutural sinus more or less marked; canal short, straight, wide; exterior sometimes marked with rather rugged lines of growth, or quite smooth, but not polished; color livid purple, with a superficial wash of white, a solid white line below the suture, anterior extremity of the columella white, callus evident but not conspicuous. Long., 33; lat., 2 in. (Dall.)

TYPE in United States National Museum. Type locality, Norton Sound, Alaska.

RANGE. Kotzebue and Norton Sounds to Chirikoff Island, Alaska.

Lora violacea Mighels and Adams, 1842

Proceedings of the Boston Society of Natural History, 1:50. G. O. Sars, *Mollusca regionis arcticae Norvegiae;* Pl. 17, figs. 2, 3.

Testâ atro-purpureâ, longitudinaliter sub-plicatâ, transverse, striata; anfractibus sex, ultïmo suprà carinato, plicis in medio evanescentibus, alteris medio carinatis; spirâ acutâ; aperturâ angustatâ; caudâ brevi. Length, .3; breadth, .15 in. (Mighels and Adams.)

Shell purplish-black, longitudinally sub-plicate, transversely striate; whorls six, the last carinated above and with evanescent median folds, the other whorls medially carinated; spire acute; aperture narrow; canal short. (Gould, *Invertebrates of Massachusetts.*)

TYPE in Amherst College. Type locality, Casco Bay, Maine.

RANGE. Sea Horse Islands, Arctic Ocean, to Bering Sea to Sitka, Alaska. Circumboreal. Fossil on Gravuna Island.

Lora nodulosa Krause, 1886

Plate 11, fig. 4

Archiv für Naturgeschichte, 51: 277; Pl. 18, figs. 4, 12.

Testa forma et colore "Belae violaceae" simillima, sed major et sculptura magis conspicus, praeterea carinis duabus nodulosis etiam in ultimo anfractu valde conspicuis diversa. Long. usque ad. 14.5 mm. (Krause.)

Shell in form and color like *Bela violacea,* but larger and with more conspicuous sculpture, besides differing in the nodulous carinae strongly conspicuous even on the last whorl. (Translation.)

TYPE in Stuttgart Royal Cabinet. Type locality, St. Lawrence Bay, Bering Strait.

RANGE. St. Lawrence Bay, Bering Strait, to Aleutian and Cook's Inlet.

Described as *Bela nodulosa.*

Lora alaskensis Dall, 1871

American Journal of Conchology, **7**:98. *Proceedings of the United States National Museum,* **9**; Pl. 4, fig. 3, 1886.

Shell elongate, fusiform, of a reddish or purplish brown, of eight evenly rounded whorls; aperture less than half and more than a third. as long as the shell, rather narrow; outer lip thin, sharp; columella straight, with a slight callus; canal short, wide, very slightly recurved; sutural sinus obsolete. Sculpture of almost imperceptible revolving lines, crossed by oblique longitudinal ribs, waved near the suture and obsolete on the lower half of the whorl. Lines of growth irregular, quite evident; epidermis thin, olivaceous; whorls slightly shouldered; nucleus and first few small whorls whitish; nucleus smooth, obliquely bent, minute; suture deep, impressed; a slight callus on the columella. Interior of the aperture polished, smooth, fuliginous. Ribs rather strong on the upper whorls. Long., .8; lat., .3 in. (Dall.)

TYPE in United States National Museum. Type locality, Unga Island, of the Shumagin group in the North Harbor, in four fathoms.

RANGE. Bering Sea to Puget Sound.

Described as *Mangilia alaskensis.*

Lora beckii Möller, 1842

Index Molluscorum Groenlandiae, 14.

Testa ovata, atro-purpurea, laeviuscula; anfr. 5½ rotundatis, ventricosiusculis, longitudinaliter et transversim minutissime striatis; spira breviore. L. 5‴. (Möller.)

Shell ovate, dark purple, smoothish 5½ rounded somewhat ventricose whorls, longitudinally and transversely very minutely striated. (Translation.)

TYPE in Copenhagen. Type locality, Arctic Coast.
RANGE. Bernard Harbor, Arctic coast, and eastward.

Lora excurvata Carpenter, 1865

Proceedings, Philadelphia Academy of Natural Sciences, 63. *Proceedings of the United States National Museum,* **56**; Pl. 14, fig. 5, 1919.

B. t. *B. treveylianae* simili, sed alba, curtiore, marginibus spirae valde excurvatis; anfr. nucleosis? . . . . (erosis;) dein iv. normalibus, subplanatis, fere rectangulatim prope suturas tabulatis; costis obtusis radiantibus circiter xviii medio anfractus et prope suturam obsoletis, postice retrorsum valde arcuatis; sulcis spiralibus subdistantibus impressis, costas superantibus, in spira circiter v., postice evanidis, antice crebrioribus; apertura longiusovali, antice brevissime canaliculato, postice alte sinuato; labro acuto, medio valde excurvato; columella regione labii eroso. Long., 28; long. spir., 13; lat., 15 poll. (Carpenter.)

Bela like *B. treveyliana,* but white, stouter, with margins of the spire strongly curved out; with nuclear? . . . . (whorls eroded;) then 4 normal subplanate almost regularly tabulate near the sutures, with about 18 obtuse radial costae, obsolete in the middle of the whorl and near the suture, in the rear strongly arcuate backward; with impressed somewhat distant spiral furrows surpassing the costae, on the spire about 5 vanishing in the rear, in front more frequent; with aperture more extended oval, in front very briefly canaliculate, in the rear deeply sinuate; outer lip acute, in the middle strongly excurvate; columella excavate in the region of the inner lip. (Translation.)

TYPE in United States National Museum? Type locality, Puget Sound.
RANGE. Bristol Bay, Bering Sea, to Puget Sound.

Lora trevelliana Turton, 1834

Annals and Magazine of Natural History, 7:351. G. O. Sars, *Mollusca regionis arcticae Norvegiae;* Pl. 16, fig. 13, 1878.

Testa ovato-fusiform; anfractibus 6–7 striis numerosissimis, apice deplanatis.

Shell oval-fusiform with 6 or 7 volutions, very closely striate, and flattened at their tops. (Turton.)

Shell somewhat thin, ovately fusiform, subventricose; whorls six, slightly planate above the carina; aperture nearly equally contracted above and below; outer lip a little insinuate below the shoulder; surface lightly decussated by inconspicuous longitudinal plications, evanescent below the

middle of the body-whorl, and close, fine revolving striae; whitish. Length, 8–13 mm. (Tryon, *Manual of Conchology.*)

TYPE in British Museum. Type locality, Scarborough.

RANGE. Arctic Ocean southward to Behn Canal, Alaska, Circumboreal. Fossil in the red and coralline crags.

Described as *Pleurotoma trevellianum* Turton, and *Mangilia trevelliana* Forbes and Hanley.

Lora lawrenceana Dall, 1919

Archiv für Naturgeschichte, **51**: 274; Pl. 18, fig. 8.

New name for *Lora tenuilirata* Krause, 1886.

Eine Zeichnung eines unserer Exemplare, die wir Herrn Dall übersandt hatten, wurde von diesem als zur obigen Art zugehörig bezeichnet. Die Gestalt der Schale ist bald mehr bald weniger gedrungen, doch bleiben Beschaffenheit, Sculptur und Farbe ziemlich gleichartig. Nach freundlicher brieflicher Mittheilung des Herrn Dall erreicht diese Art mitunter eine Lange von 30 mm. Das grösste unserer Exemplare von 15.5 mm. Lange ( ) hat pfriemenformige Uncini von 0.14 mm. Lange, die sich durch ein grosses stumpf abgerundetes Manubrium auszeichnen. Der Deckel ist langlich, unten hakenformig. (Krause.)

TYPE in Stuttgart Royal Cabinet. Type locality, Plover Bay.

RANGE. Point Belcher, Arctic Ocean, to Pribilof Islands, Bering Sea.

Lora arctica A. Adams, 1855 (see Appendix, p. 284)

Genus **PLEUROTOMELLA** Verrill, 1873

Shell with a small blunt nucleus of several whorls, closely arcuately axially ribbed, the succeeding whorls with axial and spiral sculpture, short-fusiform; the anal sulcus close to the suture, deep and wide, with a distinct fasciole; canal very short, narrow, recurved; outer lip thin, simple, sharp; pillar thin, gyrate, anteriorly obliquely truncate, almost pervious. (Verrill.)

TYPE, *Pleurotomella packardii* Verrill.

DISTRIBUTION. Oregon to Ecuador and Galapagos Islands.

Pleurotomella thalassica Dall, 1919

Proceedings of the United States National Museum, **56**:51; Pl. 3, fig. 4.

Shell small, snow-white, with five or more whorls exclusive of the (lost) nucleus; suture distinct, appressed, the fasciole in front of it con-

stricted, giving the whorls a conspicuous shoulder; spiral sculpture of a few obsolete threads on the base, not extending to the canal and with wider interspaces; axial sculpture of (on the penultimate whorl, 16) strong obliquely protractive ribs, most prominent at the shoulder where they begin, disappearing on the base and obsolete on the last whorl; the incremental lines are inconspicuous; aperture rather wide, anal sulcus close to the suture, rounded, rather wide but not deep; outer lip thin, much produced; inner lip erased, pillar short, canal short, deep, distinct, recurved, with a distinct siphonal fasciole. Height of shell, 10; of last whorl, 5.5; diameter, 5 mm. (Dall.)

TYPE in United States National Museum, No. 214206. Type locality, Station 3346, off Tillamook Bay, Oregon, in 786 fathoms.

RANGE. Known only from type locality.

Pleurotomella herminea Dall, 1919

Plate 3, fig. 1

Proceedings of the United States National Museum, **56**:50; Pl. 3, fig. 6.

Shell of moderate size, gray, with brown apex; nucleus eroded; with a total of eight whorls; suture distinct, preceded by an obscure thickened margin, not appressed; whorls descending flatly from the suture to the shoulder; axial sculpture of (on the last whorl 10 or 11) short, protractively oblique rounded ribs, extending on the spire from the shoulder to the succeeding suture, but on the last whorl not over the base; and obscure incremental lines arcuate on the anal fasciole; spiral sculpture on the spire of three or more threads, with subequal interspaces, in the space between the periphery and the succeeding suture, and on the last whorl on the base about twenty flatter spirals with narrower interspaces; most of the threads are swollen where they pass over the ribs; aperture wide and short; anal fasciole deep and rounded, not quite adjacent to the suture; outer lip thin, produced, sharp; body erased; pillar short, gyrate, but the axis not pervious; canal distinct, short, slightly recurved. Height of shell, 19; of last whorl, 12; diameter, 8 mm. (Dall.)

TYPE in United States National Museum, No. 210544. Type locality, Station 4407, off Catalina Island, in 600 fathoms.

RANGE. Known only from type locality.

Genus **GLYPHOSTOMA** Gabb, 1873

Shell small, fusiform, elegantly and profusely sculptured; aperture varicose, columella lip lirate or denticulate, the outer lip similarly orna-

mented; sinus deep and conspicuous, canal moderately produced and recurved, operculum absent; nucleus conic, of a few polished unicarinate whorls. (Gabb.)

TYPE. *Glyphostoma dentifera* Gabb.

DISTRIBUTION. Japan, west coast of North America. Fossil: Pliocene and Pleistocene of California.

Glyphostoma conradiana Gabb, 1869

Paleontology of California, **2**:7; Pl. 1, fig. 12.

Shell small, robust, broadly fusiform; spire high; whorls seven and a half, the first smooth and round, the remainder angulated; concave above, convex on the side; suture very indistinct. Surface marked by ten or twelve large, rounded, radiating ribs, crossed by square elevated ribs, with sometimes smaller ones interposed; on the upper or concave portion of the whorl are six or seven fine linear revolving ribs; of the large revolving ribs, three or four only appear on the upper whorls, the body volution showing about fourteen. Aperture narrow; inner lip thinly incrusted; outer lip acute on the edge, thickened behind; posterior sinus narrow, deep, oblique, bordered by a thickened rim and almost adjoining the suture. (Gabb.)

Length ½ inch.

Type locality, Post-Pliocene of Santa Barbara, California.

RANGE. San Pedro, living; Pliocene and Pleistocene, California.

Glyphostoma adria Dall, 1919

Proceedings of the United States National Museum, **56**:52; Pl. 17, fig. 5.

Shell small, slender, acute, whitish with the aperture more or less tinged with brown; nucleus white, glassy, with a minute globular apex and four subsequent whorls changing abruptly into the sculpture of the six subsequent whorls; the first of the latter has a peripheral keel changing on the next whorl to two and on the later whorls to three equidistant prominent cords with a smaller one behind and another in front of and close to the suture; on the last whorl the latter is obsolete and on the base there are 9 or 10 cords with interspaces widening toward the periphery, of which cords the more prominent are minutely nodulous or swollen when they cross the axial riblets; there is a wide concave anal fasciole in front of the suture with arcuate striation; the whorls at the suture somewhat appressed; axial sculpture is composed of about a dozen rather feeble ribs extending from the anal fasciole forward to the suture,

but which are nearly obsolete on the second half of the last whorl; aperture rather narrow, the outer lip varicose, minutely denticulate within and a sharp edge, the anal sulcus deep and rounded with a nodular callus on the body; inner lip with six or more denticulations; canal short, deep, and strongly recurved. Height of shell, 10; of last whorl, 5; diameter, 3.7 mm. (Dall.)

TYPE in United States National Museum, No. 267597. Type locality, head of Conception Bay, Lower California.

RANGE. San Pedro, California, to Santa Maria Bay, Lower California.

Glyphostoma cymodoce Dall, 1919

Proceedings of the United States National Museum, **56**:54; Pl. 17, fig. 6.

Shell small, flesh colored, slender, acute, with a smooth, small, purple-brown nucleus of about two whorls and about six subsequent whorls; suture appressed with a slightly constricted fasciole immediately in front of it sculptured by half a dozen fine, sharp, close-set, equal, spiral threads; other spiral sculpture of (on the spire two to four) flattish spiral major cords with equal or wider interspaces in which runs an intercalary smaller thread; on the last whorl this sculpture is continuous over the shell from the shoulder to the base, but the intercalary threads gradually enlarge until they are practically equal to the originally larger cords; the small siphonal fasciole has a few finer and closer threads; axial sculpture of (on the penultimate whorl about 11) rounded vertical ribs extending from the shoulder to the succeeding suture, but obsolete on the last whorl and nodulose where they are intersected by the cords; the incremental lines are only conspicuous on the anal fasciole, where they are slightly puckered in front of the suture; aperture subovate, anal sulcus deep, rounded, close to the suture with a subsutural callus; outer lip thickened, slightly crenulate by the external sculpture, smooth within, arcuately produced, with a prominent varix behind it; inner lip erased, pillar short, canal short, distinct, slightly recurved. Height of shell, 11.5; of last whorl, 6; diameter, 4 mm. (Dall.)

TYPE in United States National Museum, No. 150569. Type locality, Santa Barbara, California.

RANGE. Monterey to Santa Barbara, California.

Genus **PHILBERTIA** Monterosato, 1884

Philbertia has the outer lip thickened, lirate or dentate within when adult, pillar smooth, nucleus smooth, rather elevated and acute. Differs

from *Glyphostoms* by smaller size, less brilliant surface, less fusiform profile, less contracted mouth and different nucleus. (Dall.)

TYPE. *Pleurotoma bicolor* Risso.

DISTRIBUTION. California to Gulf of California.

Philbertia canfieldi Dall, 1871

American Journal of Conchology, 7:101; Pl. 15, fig. 9.

Shell solid, elongated, turreted, of five or six whorls; apex pointed, nucleus small, hyaline, of one whorl, smooth, subsequent whorls more or less shouldered or carinated above, or rounded, suture impressed rather deep. Aperture less than half and more than a third as long as the shell, rather narrow; outer lip thickened, very effuse, internally ridged with from three to six elevated lines terminating in tooth-like nodules. Canal short, rather wide. Sinus somewhat below the suture, deep and prominent with the portion between it and the suture, forming a tooth-like projection on the upper part of the inner lip. Columella smooth in the young, with from one to four crenulations or nodules in the adult, near the anterior end. Upper portion smooth. Sculpture consisting of revolving rounded even ridges, sixteen or less on the last whorl, crossed on the upper part of the whorl by numerous indistinct longitudinal plications, which vanish on the lower half of the whorl. One of the revolving ridges near the suture is sometimes stronger than the rest, giving a carinated shoulder or tabulate appearance to the upper portion of the whorls. Color yellowish-white with three purplish bands often absent, wholly or in part, one on the lower, one on the middle and one on the upper portion of the whorl. These are only apparent on the last whorl in most cases. Long., .32; lat., .14 in. (Dall.)

TYPE in United States National Museum. Type locality, Monterey, California.

RANGE. Crescent City to Laguna Beach, California.

Philbertia affinis Dall, 1871

American Journal of Conchology, 7:102. *Proceedings of the California Academy of Sciences,* 5; Pl. 2, fig. 7.

Shell resembling the last, but smaller, though with as many whorls. Sculpture similar, but much coarser and stronger, with the longitudinal plicae represented by strong rounded ribs, which pass clear over the whorls, which are more inflated than in the last. Aperture smaller and narrower than in the last, less than one-third as long as the shell. Canal very short and narrow. Outer lip internally lirate, much thickened with two strong

tooth-like dentations. Inner lip with four or five crenulations on the columella. Coloration livid purple with a single white band on the middle of the last whorl, which appears just above the suture on the next whorl. Long., .25; lat., .11 in. (Dall.)

TYPE in United States National Museum, No. 4084. Type locality, Cape San Lucas, Lower California.

RANGE. San Miguel Island, Long Beach, to Laguna Beach to Cape San Lucas, Lower California.

Philbertia rava Hinds, 1843

Proceedings, Zoölogical Society of London, 39. *Zoölogy of the Voyage of H.M.S. Sulphur;* Pl. 5, fig. 18, 1884.

Testa ovata, acuminata; anfractibus octonis, rotundatis, costulatis, transversim striatis; costulis rotundatis, suturam incurrentibus; infra suturam purpureo spiraliter fasciata, anfractu ultimo iterata; labro intus crenulato; aperturo ovali; canali brevi. Axis 5 lin. (Hinds.)

Fulvus, the interstices of the ribs and edge of the lip stained purple-red; sinus wide and deep. Length, 12 mm. (Tryon, *Manual of Conchology.*)

TYPE in Cuming Museum. Type locality, Gulf of Nicoya, Central America.

RANGE. Laguna Beach, California, to Gulf of California.

Philbertia crystallina Gabb, 1865

Plate 3, fig. 5

Proceedings of the California Academy of Sciences, 3:184.

Shell small, fusiform; nuclear whorls two, smooth, normal whorls four obliquely truncated above, angulated, below the angle somewhat convex; surface marked by numerous small revolving ribs, except on the middle of the whorls, where they are larger, more distant and ornamented by small nodes; aperture rather broad; inner lip slightly encrusted; outer lip thickened behind, subacute on the margin, posterior sinus moderately deep, round and with a polished and thickened margin, placed close to the suture; canal very slightly twisted; color a pure white, polished. Long., .35; lat., .13; long. aper., .16 in. (Gabb.)

TYPE in State Geological Survey, Mollusca, No. 1052. Type locality, Catalina Island in 40 fathoms.

RANGE. Known only from type locality.

Philbertia hesione Dall, 1919

Proceedings of the United States National Museum, **56**:54.

Shell small, whitish, biconic, acute, with a smooth bulbous nucleus of a whorl and a half and four and a half subsequent sculptured whorls; suture distinct, not appressed, the anal fasciole close to it, flattish, at first with fine spiral sculpture but on the last whorl it becomes nearly smooth; other spiral sculpture of a narrow, prominent thread at the periphery which is doubled on the subsequent turns, on the last whorl there are eleven of the threads, which are somewhat nodulose where they override the ribs, with much wider interspaces, and a few close threads on the canal; axial sculpture of about 13 somewhat oblique narrow ribs, extending from the suture to the shoulder on the spire, and on the last whorl obsolete on the base; they are separated by wider interspaces and the incremental lines are feeble; aperture narrow, the anal sulcus narrow, deep, rounded close to the suture, with a conspicuous subsutural callus; outer lip thin with a moderate varix behind it, and no internal lirae; inner lip erased, pillar short; canal short, deep, distinct, slightly constricted and recurved; there is a small nodule at the inner anterior end of the outer lip where the canal begins. Height of shell, 9.5; of last whorl, 6; diameter, 4 mm. (Dall.)

Type in United States National Museum, No. 211333. Type locality, Station 2902, off Santa Rosa Island, California.

Range. Point Pinos to Point Loma, California.

Philbertia castianira Dall, 1919

Proceedings of the United States National Museum, **56**:15; Pl. 2, fig. 1.

Shell small, white, apex eroded, having five or more whorls exclusive of the (lost) nucleus; whorls well-rounded, anal fasciole excavated, close to the appressed suture; spiral sculpture of (on the upper whorls in front of the fasciole, three, on the last whorl about a dozen between the fasciole and the end of the canal) strong, equal, equally spaced, rounded threads, with wider smooth interspaces; axial sculpture of (on the penultimate whorl 14) low riblets barely reaching the base and starting from the shoulder, with subequal interspaces, and becoming obsolete near the aperture; they are subnodulous at the intersections with the spirals; aperture rather wide, anal sulcus deep, close to the suture with a subsutural callus; inner lip erased; outer lip thin, hardly varicose; canal distinct, short, recurved. Height of shell, 10; of last whorl, 6; diameter, 4.5 mm. (Dall.)

TYPE in United States National Museum, No. 214246. Type locality, Station 3189, off Cape San Martin, California, in 218 fathoms.

RANGE. Known only from type locality.

Philbertia louisa Dall, 1919

Proceedings of the United States National Museum, **56**:75; Pl. 24, fig. 3.

Shell minute, nucleus with a small apex, the whorls later swollen, the second turn with three strong spiral threads, the following three whorls with 11 or 12 axial ribs with subequal interspaces and no pronounced shoulder; spiral sculpture between the sutures of three strong subequal flattish threads somewhat swollen when they override the ribs, and with a few much finer threads in the interspaces between the major threads; the spaces between the reticulation on the earlier whorls are deep and have a pitlike aspect; near the suture in fresh specimens is a dark spiral band extending to the rounded shoulder, in front of which the shell is yellowish-white with (on the last whorl) four or five narrow, brown, spiral lines with much wider interspaces; aperture moderately wide with a very shallow ill-defined sulcus, the outer lip thickened, smooth, the canal wide, not differentiated from the aperture, the inner lip smooth. Height of shell, 4.25; of last whorl, 2.7; diameter, 1.7 mm. (Dall.)

TYPE in United States National Museum, No. 160122. Type locality, off San Luis Obispo, California.

RANGE. Known only from type locality.

Philbertia capaniola Dall, 1919

Proceedings of the United States National Museum, **56**:304.

Shell small, strongly sculptured, yellowish-white, elevated, with about six whorls, including the smooth minute nucleus of about one whorl; suture distinct, rather deep, whorls well-rounded; axial sculpture of (on the last whorl 11, omitting the final varix) narrow rounded ribs with a slight shoulder, extending to the canal, with wider interspaces, both crossed by the spirals but without nodulation; spiral sculpture of (on the spire in front of the shoulder about 4) well-defined cords with narrower interspaces, which become more or less obsolete on the last whorl; aperture narrow, the anal sulcus shallow and producing no very marked fasciole; outer lip infolded, thick, with a varical swelling behind it, simple within; body erased, pillar short, straight, canal hardly differentiated. Height of shell, 6.5; of last whorl, 4; of aperture, 3.5; diameter, 3 mm. (Dall.)

TYPE in United States National Museum, No. 150992a. Type locality, off San Diego, California.

RANGE. Known only from type locality.

Genus **MANGILIA** Risso, 1826

Shell elevated, spire longer than the aperture, longitudinally ribbed, spirally minutely sculptured; pillar smooth, outer lip thin, simple, notch at the suture, nucleus smooth, short, last turn finely cancellate, no operculum. (Dall.)

First species, *Mangilia costulata* Risso.

Mangilia barbarensis Oldroyd, 1924

Annals and Magazine of Natural History, ser. 3, **15**:395. Arnold, *Paleontology of San Pedro, California;* Pl. 7, fig. 9, 1903.

New name for *M. angulata* Carpenter, 1865, preoccupied.

M. testa parva, rufo-purpurea, vix gracili, epidermide tenui fugaci; anfr. nucl. iii., helicoideis, primum laevibus, dein cancellatis, apice mamillato; anfr. norm. iv., convexis, suturis impressis, in medio spirae obtusangulatis; costis radiantibus circ. xii., acutioribus; costula spirali circa angulum, inter costas subobsoleta; tota superficie tenuiter spiraliter crebrisulcata, sulculis sub lente saepius bifidis; apertura pyriformi, canali longiore, recto aperto; labro acuto, postice conspicue sinuato; columella haud contorta; labro obsoleto. Long., .35; long. spir., .18; lat., .13 in. (Carpenter.)

Shell small, turreted, elongate-fusiform; apex acute; whorls six, broad and angular, angle being slightly posterior to middle; sculpture consists of ten prominent, rather sharp, transverse ridges which reach maximum prominence on angle of whorls; suture deeply impressed, distinct, aperture oblique, narrow, elliptical, drawn out anteriorly into a short, narrow canal; outer lip thin; simple, arcuate; inner lip smooth. (Arnold.)

Type in British Museum? Type locality, Santa Barbara, California.

Range. Puget Sound to Gulf of California.

Reeve described a *Mangilia angulata,* 1846, and the type locality was Manila Bay, Philippines. Carpenter named *Mangilia angulata* in 1865 and the type locality, Santa Barbara, California.

Mangilia aleutica Dall, 1871

American Journal of Conchology, **7**:99. *Proceedings of the United States National Museum,* **9**; Pl. 3, fig. 6, 1886.

Shell pure white, elongated, acuminated, of seven whorls carinated above, though not very strongly. Aperture narrow, long, two-fifths the length of the shell; outer lip sharp, thin, strongly flexuous, produced below, sinus close to but not on the suture, not very deep or prominent; canal one-third as long as the aperture, straight, narrow; columella smooth,

almost straight, without callus; nucleus smooth, white, pointed, drawn out; sculpture consisting of longitudinal ribs thirteen or fourteen on the last whorl, obsolete on the lower third of the whorl and not extending to the suture, below which is a smooth band only marked by oblique lines of growth; ribs slightly nodulous at their posterior terminations (where they are united by a slight carina) strong on the upper whorls, slightly flexuous on the convexity of the whorl. Whorl below the carina marked by very faint grooves close together and passing over the ribs, stronger at the anterior end of the last whorl. Long., .68; lat., .24 in. (Dall.)

TYPE in United States National Museum. Type locality, Unga Island, of the Shumagin group, in the North Harbor.

RANGE. Cape Sabine, Arctic Ocean, to Straits of Juan de Fuca.

Mangilia carlottae Dall, 1919

Plate 2, fig. 24

Proceedings of the United States National Museum, **56**:65; Pl. 21, figs. 9, 12.

Shell small, thin, snow-white, with a swollen smooth nucleus of two whorls and six subsequent whorls; suture distinct, not appressed; the anal fasciole sloping forward flatly to the shoulder of the whorl with only arcuate incremental lines for sculpture; axial sculpture of (on the last whorl, about 20) obliquely protractive short ribs, strongest at the shoulder and on the last whorl stopping abruptly near the periphery; spiral sculpture hardly perceptible; on the base are a few distant obsolete threads and faint microscopic striae; these vary in strength in different specimens; anal sulcus rounded, wide, and shallow; outer lip thin, sharp, arcuately produced; aperture narrowly ovate, inner lip erased; pillar and canal short, the latter wide and hardly differentiated. Height of shell, 9; of last whorl, 5.5; diameter, 4 mm. (Dall.)

TYPE in United States National Museum No. 210724. Type locality, Station 2860, off Queen Charlotte Islands, British Columbia.

RANGE. Off Queen Charlotte Islands, British Columbia, in 876 fathoms.

Mangilia nunivakensis Dall, 1919

Proceedings of the United States National Museum, **56**:67; Pl. 23, fig. 2.

Shell thin, rather large, whitish, acute, elevated, of about seven whorls, the nucleus eroded, suture distinct, the anal fasciole hardly constricted, concavely wrinkled; axial sculpture of (on the penultimate whorl, about 18) protractive rather feeble, rounded ribs, with subequal interspaces, becoming obsolete on the base; spiral sculpture practically none; aperture

simple, anal sulcus wide and shallow, outer lip arcuate, canal straight. Height of shell, 18; of last whorl, 12; diameter, 6 mm. (Dall.)

TYPE in United States National Museum, No. 220348. Type locality, Bering Sea, near Nunivak Island.

RANGE. Known only from type locality.

Mangilia eriopis Dall, 1919

Proceedings of the United States National Museum, **56**: 67; Pl. 23, fig. 1.

Shell small, white, polished, having a nucleus with an oblique smooth small apex and about one whorl, the latter part spirally striated, and about six and a half subsequent whorls; spire acute, slender, the whorls moderately rounded, the suture distinct, not appressed; spiral sculpture of a few obscure threads on the back of the canal and on the apical whorls; axial sculpture of (on the last whorl, about 15) sigmoid ribs, most prominent at the shoulder, feeble over the anal fasciole and on the base; aperture narrowly ovate, anal sulcus shallow and wide, beginning at the suture; outer lip produced, thin and sharp; inner lip and pillar with a thin wash of enamel; pillar straight, attenuated in front, canal short and narrow. Height of shell, 13.5; of last whorl, 7.5; diameter, 5 mm. (Dall.)

TYPE in United States National Museum, No. 216411. Type locality, Forrester Island, Alaska.

RANGE. Forrester Island, Alaska, to Queen Charlotte Islands.

Mangilia constricta Gabb, 1865

Proceedings of the California Academy of Sciences, **3**: 184.

Shell white, solid, smooth, subfusiform; whorls seven, suddenly constricted at the upper portion, near the suture; suture impressed; body whorls rapidly expanded below the constriction; aperture wide, columellar lip encrusted; canal short; outer lip acute, prominent in the middle; posterior sinus deep, angular above and adjoining the suture. (Gabb.)

TYPE in State Geological Survey, Survey Cabinet, Mollusca, No. 1055. Type locality, Santa Catalina Island, in 80 fathoms.

RANGE. Known only from type locality.

This was described as *Clathurella constricta* Gabb.

Mangilia granitica Dall, 1919

Proceedings of the United States National Museum, **56**: 67.

Shell, small, waxen white, darker on the pillar, with two nuclear and about five subsequent whorls; nucleus flat-topped, the first whorl with one strong keel, the second with three, the suture is laid on the anterior

keel, which is smaller, and in the subsequent whorls the suture is not appressed but distinct; spiral sculpture of on the first two whorls a strong peripheral cord and one thread at the suture, on the third whorl three threads in front of the cord, on the remainder four, on the last whorl the peripheral cord is not prominent but from the anal fasciole to the canal are about 16 strong threads with wider interspaces and an occasional intercalary smaller thread; they do not nodulate when they cross the ribs; on the canal are numerous small close-set threads; the anal fasciole is without spiral sculpture; axial sculpture of (on the last whorl, 13) strong rounded ribs not continuous up the spire and obsolete on the base but prominent and arcuate over the fasciole, reaching the preceding suture which they undulate; aperture rather narrow, the anal fasciole at the suture, shallow and wide, the outer lip thin, moderately produced, the inner lip smooth, erased; pillar short, straight, attenuated in front, canal short but distinct. Height of shell, 13; of last whorl, 8; diameter, 5 mm. (Dall.)

TYPE in United States National Museum, No. 208560. Type locality, Granite Cove, Port Althorp, Alaska.

RANGE. Known only from type locality.

Mangilia althorpi Dall, 1919

Proceedings of the United States National Museum, **56**:68; Pl. 19, fig. 9.

Shell small, waxen white, superficially resembling *M. granitica,* but differing in the following particulars: It has one rib less; the two prominent spiral cords on the early whorls are strongly nodulous when they cross the ribs, especially the posterior cord, even on the last whorl; the spiral sculpture on the last whorl in front of the fasciole comprises 10 strong flattish cords, separated by very sharp, narrow grooves, with no spiral sculpture on the back of the canal, which is distinctly shorter; aperture relatively shorter and wider; the nucleus apparently similar but eroded, the number of whorls is the same but the shell is shorter. Height of shell, 11.5; of last whorl, 6.5; diameter, 4.5 mm. (Dall.)

TYPE in United States National Museum, No. 208560a. Type locality, Station 1413, Granite Cove, Port Althorp, Alaska.

RANGE. Known only from type locality.

Mangilia sculpturata Dall, 1886

Proceedings of the United States National Museum, **9**:299; Pl. 4, fig. 7.

Shell seven-whorled, turreted, white, with strong waxen yellow epidermis; thin, with strong sculpture; transverse sculpture of, on the last

whorl, ten, strong, squarish ribs and numerous fine and occasionally impressed lines of growth; longitudinal sculpture of a distinct angulation of the whorl, in front of the anal fasciole, which on the transverse ribs develops into stout swellings, which in the earlier whorls are connected by an obscure rib; the whole surface of the whorl is covered with rather wide and shallow grooves and their even wider interspaces; the grooves are closest and finest on the canal and behind the angulation, and faintest or nearly absent on the periphery; anal notch very shallow, fasciole nearly obsolete. Operculum short, triangular, yellowish-brown. Greatest length of shell, 12.3; of aperture, 5.5; greatest width of shell, 4.5 mm. (Dall.)

TYPE in United States National Museum. Type locality, Aleutian Islands.

RANGE. Chiachi Islands to Port Etches, Alaska.

Mangilia beta Dall, 1919

Proceedings of the United States National Museum, **56**:64; Pl. 22, fig. 4.

Shell small, yellowish, with a pale canal, a blunt smooth nucleus of two whorls and three and a half subsequent whorls; periphery slightly behind the middle of the whorl; from the distinct suture the surface slopes flatly to the subangular periphery, the rest of the whorl rounded; spiral sculpture of uniform fine threads with narrower interspaces over the whole surface; axial sculpture of (on the last whorl, 15) narrow rather sharp ribs with much wider interspaces, obsolete behind the shoulder and on the base; there are also fine incremental lines which roughen the spiral threads; anal fasciole inconspicuous, anal sulcus feeble; aperture simple, outer lip sharp; axis pervious, pillar attenuated in front, canal short. Height of shell, 5; of last whorl, 3; diameter, 2 mm. (Dall.)

TYPE in United States National Museum, No. 206554. Type locality, off Point Ano Nuevo, California, in 67 fathoms.

RANGE. Point Ano Nuevo, California, to Coronado Islands.

Mangilia eriphyle Dall, 1919

Proceedings of the United States National Museum, **56**:69.

Shell small, solid, whitish, acute, fusiform, with one and a half nuclear and six subsequent whorls; nucleus with a minute apex and a swollen smooth globular succeeding whorl; these are followed by a peripherally keeled whorl, the subsequent turns developing two and then three spiral flattish spiral cords, including the peripheral one and in front of it, while behind the keel the surface slopes flatly up to the appressed suture, only interrupted by obscure ridges due to the axial sculpture; on the last

whorl in front of the anal fasciole there are about a dozen similar cords extending to the end of the canal with about equal channeled interspaces, the posterior two or three cords more or less nodulous at the intersections; axial sculpture of about 10 more or less prominent riblets beginning in front of the fasciole and extending slightly over the periphery on the last whorl becoming obsolete; the incremental lines not conspicuous; aperture narrowly ovate, the outer lip somewhat varicose with a large shallow rounded anal sulcus close to the suture; within both inner and outer lips are smooth and moderately callous; canal short, wide, slightly recurved. Height of shell, 10.5; of last whorl, 6; diameter, 4 mm. (Dall.)

TYPE in United States National Museum, No. 211326. Type locality, Station 2902, off Santa Rosa Island, California.

RANGE. Off Esteros Bay, California, to Coronado Islands, Mexico.

Mangilia cesta Dall, 1919

Proceedings of the United States National Museum, **56**:71; Pl. 21, fig. 7.

Shell small, whitish, polished, with (on the last whorl, six or seven) widely spaced, narrow, brown, spiral lines; whorls six without the (lost) nucleus; suture distinct, axial sculpture of ten rounded ribs extending across the whorl with subequal or wider interspaces; the ribs are not shouldered and start from the suture which they undulate; spiral sculpture of incised lines in the interspaces between the ribs, the brown color is situated in these grooves of which there are six or more on the last whorl, rather widely spaced; aperture simple, anal sulcus inconspicuous, canal very short and wide. Height of shell, 7; of last whorl, 4; diameter, 5 mm. (Dall.)

TYPE in United States National Museum, No. 209040. Type locality, San Pedro, California.

RANGE. Known only from type locality.

Mangilia evadne Dall, 1919

Proceedings of the United States National Museum, **56**:69; Pl. 23, fig. 2.

Shell small, white, slender, with a smooth swollen nucleus of one and a half whorls and five subsequent whorls; suture constricted, distinct not appressed, the whorls sloping flatly toward it on both sides; axial sculpture only of faint incremental lines; spiral sculpture of one very prominent keel at the shoulder with one smaller and several still finer threads behind it, the anal fasciole smooth; on the last whorl there are two major threads with much wider interspaces, in front of them about six smaller closer threads to the canal which has about six close-set threads and a marked siphonal fasciole; aperture rather narrow, the anal sulcus deep, rounded,

separated by a single thread from the suture; outer lip thin, produced, sharp; inner lip erased, pillar straight; canal distinct, rather wide and recurved. Height of shell, 12; of last whorl, 3.5; diameter 3 mm. (Dall.)

TYPE in United States National Museum, No. 211334. Type locality, Station 2902, off Santa Rosa Island, California.

RANGE. Off Santa Rosa Island, California, in 53 fathoms.

Mangilia oenoa Dall, 1919

Proceedings of the United States National Museum, **56**:66; Pl. 8, fig. 6.

Shell small, feebly sculptured, whitish with a yellowish underlying, and (on the spire, one; on the last whorl, two) darker spiral lines; whorls six without the (lost) nucleus; suture distinct, anal fasciole obscure; surface with uniform fine spiral striation; axial sculpture of (on the last whorl, about 15) faint narrow riblets extending entirely over the whorl with wider interspaces; aperture narrow, canal short, wide; anal sulcus faint; outer lip thin, sharp, body and pillar smooth. Height of shell, 6.5; of last whorl, 4; diameter, 2.5 mm. (Dall.)

TYPE in United States National Museum, No. 153051. Type locality, San Pedro, California.

RANGE. San Pedro, San Diego, California, to Gulf of California.

Mangilia alesidota Dall, 1919

Proceedings of the United States National Museum, **56**:304.

Shell small, yellowish, with, on the last whorl, a faint, dark band in front of the suture and an obscure, dark line at the periphery, with a dark flush on the canal; with six whorls, including a minute, smooth nucleus followed by a minutely reticulated second whorl, and then by the adult sculpture; suture distinct, slightly appressed, the anal fasciole occupying the space between it and an angular shoulder; axial sculpture of (on the penultimate whorl, 15) narrow, sharp, arcuate ribs extending from the suture over the periphery, with wider interspaces; there are also minute incremental lines roughening the spirals; spiral sculpture of numerous minutely-channeled grooves with wide flattish interspaces (the latter sometimes with a smaller median groove) covering the whole surface; aperture narrow, with a wide, very shallow anal sulcus; outer lip thin, sharp, body erased, pillar straight, axis pervious, gyrate; canal hardly differentiated. Height of shell, 7.5; of last whorl, 5.2; of aperture, 3.5; diameter, 3 mm. (Dall.)

TYPE in United States National Museum, No. 56913. Type locality, Catalina Island, California.

RANGE. Known only from type locality.

Mangilia perattenuata Dall, 1905

Nautilus, **18**: 123. *Proceedings of the United States National Museum,* **56**; Pl. 20, fig. 11, 1919.

Shell small, very slender, with one smooth turgid nuclear, and six smooth normal whorls; the whorls are but slightly convex, whitish, the suture very distinct, its posterior margin slightly overhanging or dominant; aperture narrow, short, simple, the outer lip slightly concavely waved between the periphery and the suture, canal short, a little recurved, relatively rather wide. Long. of shell, 9.5; of last whorl, 3.75; maximum diameter, 2.5 mm. (Dall.)

TYPE in United States National Museum. Type locality, Monterey Bay, California, in 10–40 fathoms.

RANGE. Known only from type locality.

Mangilia philodice Dall, 1919

Proceedings of the United States National Museum, **56**:66; Pl. 22, fig. 7.

Shell small, white, with four or more whorls exclusive of the (lost) nucleus; suture distinct, not appressed; whorls sloping behind, rounded in front; axial sculpture on (on the penultimate whorl, about 17) short rounded ribs with subequal interspaces, hardly extended over the periphery and gradually becoming obsolete on the last whorl; incremental lines somewhat conspicuous on the base where they slightly reticulate the spiral sculpture; the latter comprises three prominent cords on the periphery equal and equidistant, swollen where they override the ribs, and feebler on the last whorl; the anal fasciole carries finer equal spiral threads, the base 10 or more somewhat larger and more nearly adjacent as they approach the canal; aperture rather narrow, outer lip, solid, sharp-edged, anal sulcus large, rounded, close to the suture, inner lip erased, canal short, deep, slightly recurved. Height of last and three proceeding whorls, 7.5; of last whorl, 5; diam., 3 mm. (Dall.)

TYPE in United States National Museum, No. 208916. Type locality, Station 4454, off Point Pinos Light, Monterey, California.

RANGE. Point Ano Nuevo, California, to Coronado Islands.

Mangilia pulchrior Dall, 1919

New name for *M. nitens* Carpenter, 1865, preoccupied.

M. testa "M. variegata" simili, sed nitentiore, fascia alba et altera rufa-fusca attingente spiram ascendentibus. Long., .25; long. spir., .15; lat., .08; poll. (Carpenter.)

This has a chestnut and a white band. (Carpenter.)

TYPE in British Museum? Type locality, Santa Barbara, California.

RANGE. Monterey, California, to Magdalena Bay, Lower California.

SECTION KURTZILLA Dall, 1918

Mangilia arteaga Dall and Bartsch, 1910

Canadian Geological Survey, *Memoranda,* No. 1143, 11; Pl. 11, fig. 4.

Shell small, acute-fusiform, having about eight whorls, the initial whorl extremely minute, subsequent whorls slowly enlarging, minutely reticulate. The later whorls have a strongly marked shoulder, and are, when young, of a reddish-brown color, which gradually changes with exposure to a light gray. The sculpture of the adult whorls consists of (on the last whorl, about ten) prominent, slightly arcuate, nearly axial ribs, rather sharply nodose at the intersection with the angle of the shoulder, with wider interspaces and continuous to the canal. As to spiral sculpture of major and minor threads, there are about ten of the former in front of the shoulder, of which two are visible behind the suture on the spire; the remainder—which are much finer and minutely rugose—occupy the interspaces of the whole surface, the major threads being slightly swollen where they cross the ribs; aperture narrow; anal sinus shallow, and small; pillar and throat brownish, with a brown obscure band under the suture; outer lip sharp between, and thickened at the varices; canal short, and wide; operculum, none. Height of shell, 10.25; of last whorl, 6.5; of aperture, 4.6; maximum diameter, 4 mm. (Dall.)

TYPE in Ottawa. Type locality, Barkley Sound, Vancouver Island.

RANGE. Vancouver Island, B. C., to San Diego, California.

Mangilia arteaga roperi Dall, 1919

Proceedings of the United States National Museum, 56:64; Pl. 22, fig. 5.

Shell small, thin, grayish, with a very minute apical followed by two more or less reticulate convex nuclear whorls and four and a half subsequent whorls; suture distinct, not appressed; spiral sculpture of, on the upper whorls, one strong peripheral cord in front of which, on the penultimate whorl, is a smaller one and, on the last whorl, about five smaller ones with wider interspaces; on the canal, five or six closer, small threads; in the interspaces of the major cords are numerous minute and minutely imbricated, close-set threads, giving a rasp-like surface; axial sculpture of (on the last whorl, nine) narrow rounded threads with wider interspaces, extending from the fasciole to the canal and nodulous at the intersection

of the peripheral cord; aperture narrow, simple, anal sulcus feeble, producing hardly any appearance of a fasciole; axis nearly pervious, canal short, straight. Height of shell, 6.5; of last whorl, 4; diameter, 2.5 mm. (Dall.)

TYPE in United States National Museum, No. 150993. Type locality, Monterey, California.

RANGE. Monterey, California, to Cape San Lucas, Lower California.

Mangilia newcombei Dall, 1919

Proceedings of the United States National Museum, **56**:71; Pl. 21, fig. 4.

Shell small, brownish, with a tendency to banding, paler at the shoulder and on the base, with six whorls, including a small, smooth nuclear whorl; suture distinct, slightly appressed, with no fasciolar constriction; spiral sculpture of fine, flattish threads separated by narrow striae very minutely reticulated by incremental lines and most conspicuous in the intervals between the ribs, practically covering the whole surface of the shell; axial sculpture, beside almost microscopic lines of growth, of (on the last whorl, 14) short, rounded ribs, slightly angulated at the shoulder and extending from the suture to the canal wih subequal interspaces; anal sulcus shallow, aperture narrow, inner lip erased, canal short, straight. Height of shell, 11; of last whorl, 7; diameter, 4 mm. (Dall.)

TYPE in United States National Museum, No. 150965. Type locality, Clayoquot Sound, Vancouver Island.

RANGE. Vancouver Island to Drake's Bay, California.

Mangilia hecetae Dall and Bartsch, 1910

Plate 11, fig. 8

Canadian Geological Survey, *Memoranda,* No. 1143, 10; Pl. 1, fig. 6.

Shell small, thin, acute-fusiform, externally of a grayish color. Whorls about seven, the initial whorl minute and smooth; the second bulbous and smooth; the next, finely reticulated by fine spiral threads, and somewhat protractive arcuate, fine riblets. This sculpture gradually merges into that of the adult whorls; the latter comprise—on the last whorl—eleven or twelve arcuate ribs, retractive from the suture, protractive from the shoulder of the whorl forward of the canal. These ribs are narrow, low, rather rounded, and with interspaces of about twice their own width. The whorl slopes in a somewhat excavated manner from the suture to the shoulder, where there is a moderate angulation, sometimes forming a rather strong, spiral cord; the rest of the surface is covered with very fine, close, even, spiral threading, a little coarser on

the earlier whorls; aperture, elongate and narrow; the anal sinus wide and shallow; pillar white, with anterior end attenuated; interior of aperture white, with three brown spiral bands, wide and dark, on the inside of the outer lip, but not visible on the exterior of the shell; the outer lip is sharp except when a varix is formed, when it is slightly reflected inward; operculum none; canal short, straight, and rather wide. Height of shell, 9; of last whorl, 5.3; maximum diameter, 2.25 mm. (Dall.)

TYPE in Ottawa. Type locality, Barkley Sound, Vancouver Island, B.C.

RANGE. Vancouver Island, B.C., to San Diego, California.

Mangilia hebe Dall, 1919

Proceedings of the United States National Museum, **56**:63; Pl. 20, fig. 10.

Shell small, yellowish-white, slender, acute, with two smooth nuclear and five or six subsequent whorls; spiral sculpture of fine equal uniform threads covering the whole whorl separated by narrow grooves and given a frosty appearance by fine, sharp, incremental lines; axial sculpture of (on the last whorl, eight or nine) narrow, rounded ribs extending over the whole whorl with wider interspaces and somewhat constricted in front of the appressed suture; there is no evident anal fasciole apart from the constriction; aperture narrow, anal sulcus hardly evident, outer lip sharp, moderately varicose, smooth inside, with the spiral sculpture showing through the thin shell; inner lip erased, pillar straight, canal produced but hardly differentiated. Height of shell, 10; of last whorl, 6; diameter, 3.5 mm. (Dall.)

TYPE in United States National Museum, No. 159338. Type locality, San Diego, California.

RANGE. Known only from type locality.

Mangilia tersa Dall, 1919

Proceedings of the United States National Museum, **56**:305.

Shell small, thin, slender, acute, yellowish with a narrow peripheral brown band, which on the spire lies behind the suture; with seven and a half whorls, including the polished nucleus, which begins with a small coil, then becomes more inflated, and finally presents a peripheral keel before the normal adult sculpture begins; axial sculpture of (on the last whorl, 13) narrow, rounded ribs with much wider interspaces, extending over the base on the last whorl and most prominent at the periphery on the spire; there are also fine incremental lines which, in unworn specimens, make the sculpture minutely imbricated; suture distinct, appressed, and more or less undulated by ribs; anal fasciole wide, constricted, form-

ing a slight shoulder to the whorl in front of it; spiral sculpture of fine close scabrous, revolving threads over the whole surface; aperture narrow, outer lip thin, simple, with a wide, shallow anal sulcus, the body erased, the pillar straight, attenuated in front, canal short, hardly differentiated. Height of shell, 11; of last whorl, 6.5; of aperture, 5; diameter, 3.5 mm. (Dall.)

TYPE in United States National Museum, No. 133910. Type locality, San Diego, California.

RANGE. Known only from type locality.

SECTION CLATHROMANGILIA Monterosato, 1884

Mangilia interlirata Stearns, 1871

Proceedings of the California Academy of Sciences, **4**:226; Pl. 1, fig. 10.

Shell of a dark, reddish brown, small, solid, slender, fusiform; whorls, eight, prominently sculptured with 8–10 strong, longitudinal and 10–12 threadlike, revolving ribs, the latter of a darker shade and meeting, but not crossing, the former; aperture linear, less than half the length of the shell; outer lip simple, somewhat thickened, externally and posteriorly slightly notched. Long., .27; lat., .09 in. (Stearns.)

TYPE in United States National Museum. Type locality, Monterey, California.

RANGE. Monterey to Catalina Island, California.

Mangilia rhyssa Dall, 1919

Proceedings of the United States National Museum, **56**:62; Pl. 21, fig. 1.

Shell small, brownish, coarsely sculptured, with six whorls exclusive of the (lost) nucleus; suture appressed, somewhat constricted, obscure; upper whorls with two prominent cords crossing the ribs without nodulation, the last whorl with six, the spiral sculpture more prominent than the axial, which consists of (on the last whorl, 10) straight axial ribs continuous to the base; there are traces of some fine spiral striation; the interstices of the reticulation are deep and squarish; sutural fasciole obscure, the sulcus very shallow, the aperture short, with hardly any canal and no denticulations or lirations. Height of shell, 7; of last whorl, 4; diameter, 2 mm. (Dall.)

TYPE in United States National Museum, No. 55479. Type locality, near San Diego, California.

RANGE. San Diego, California, to Gulf of California.

Mangilia interfossa Carpenter, 1865

Annals and Magazine of Natural History, series 3, **15**: 29. Tryon, *Manual of Conchology,* **6**; Pl. 22, fig. 57.

M. testa parva, valde attenuata, rufo-fusca, marginibus spirae parum excurvatis; anfr. nucl. ii., ut in "Chrysodomo" irregularibus, apice mamillato; norm vi., parum excurvatis, haud tabulatis, suturis distinctis; costis radiantibus circ. xv., angustis, extantibus; costulis spiralibus circ. xv., quarum circ. v. seu vi. in spira monstrantur, angustis, supra costas transeuntibus, ad intersectiones parum nodulosis; interstitiis altis, quadratis; basi effusa; apertura subpyriformi; labro acuto, postice vix emarginato; labio tenui. (Carpenter.)

Shell scarcely, very narrowly shouldered, with about fifteen narrow, longitudinal ribs, separated by wider interspaces, and the same number of spiral lirae, forming subquadrangular pits between the sculpture; reddish brown. Length, 10 mm. (Tryon, *Manual of Conchology.*)

TYPE in British Museum? Type locality, Neah Bay, Washington.

RANGE. Vancouver Island, British Columbia, to Catalina Island, California.

Mangilia levidensis Carpenter, 1865

Plate 2, fig. 21

Proceedings, Philadelphia Academy of Natural Sciences, 63. *Proceedings of the United States National Museum,* **56**; Pl. 21, fig. 1, 1919.

M. t. rudi, fusca, elatiore; anfr. nucleosis iii. subelongatis, verice haud mamillato; anfr. normalibus vi. subplanatis, suturis distinctis, quarum primi costis radiantibus circiter xii. latis, interstitiis parvis, et costulis spiralibus crebrioribus, quarum v. magis insculptae supra costas transeunt, rude ornantur; anfr. ultimis sculptura subobsoleta; apertura elongata, subquadrata in canalem brevem arcuatim producta, intus hepatica; labra juxta suturam vix sinuato; labio vix conspicuo. Long., .86; long. spir., .53; lat., .29 poll. (Carpenter.)

Stumpy, purplish-brown, with rough sculpture. (Carpenter.)

TYPE in United States National Museum. Type locality, Puget Sound.

RANGE. Bering Strait to Monterey, California.

Mangilia lineolata Reeve, 1846

Conchologia Iconica, **1**; Pl. 37, fig. 337.

Shell somewhat fusiformly oblong, longitudinally obtusely ribbed; whitish, encircled with very fine, brown lines. (Reeve.) Length, 6 mm. (Tryon, *Manual of Conchology.*) (Gray, MSS.)

TYPE in Museum Gray. Type locality, not known.
RANGE. Catalina Island to Panama, and Galapagos Islands.

Mangilia crebricostata Carpenter, 1865

See Part II, Plate 15, fig. 3

Annals and Magazine of Natural History, series 3, **15**:28.

M. testa tereti, rufo-fusca, albo zonata; anfr. nucl. . . . . (decollatis); norm. v. elongatis, subrotundatis, suturis impressis; costis radiantibus, obtusis, subrectis, circ. xv., spiram ascendentibus; sculptura spirali ? . . . . (detrita); apertura pyriformi, antrorsum in canalem breven attenuata; labro postice parum sinuato; labio conspicuo. Long., .54; long. spir., .3; lat., .2 poll. (Carpenter.)

M. with shell rounded, reddish-tawney, zoned with white; nuclear whorl (decollate); normally 5, elongate-subrotund, with impressed sutures; with radial obtuse nearly straight costae, about 15 in number, ascending the spire; with spiral sculpture ?(worn off); with pyriform aperture, anteriorly attenuated into a short canal; with outer lip posteriorly slightly sinuated; with inner lip conspicuous. (Translation.)

TYPE in United States National Museum. Type locality, Neah Bay, Washington.

RANGE. Forrester Island, Alaska, to Monterey, California.

Genus **CYTHARELLA** Monterosato, 1875

These are the small species with thickened but not lirate or denticulate outer lip and pillar; the spire usually shorter than the aperture, the surface longitudinally ribbed, smooth, or spirally minutely sculptured; nucleus small, smooth. (Dall.)

TYPE. *Pleurotoma bertrandi* Payraudeau.

DISTRIBUTION. California to Gulf of California.

SECTION CYTHARELLA s.s

Cytharella hexagona Gabb, 1865

Proceedings of the California Academy of Sciences, **3**:185.

Shells small, slender, fusiformis; spire subacute, nuclear whorls two, smooth, normal whorls five, slightly subangular and ornamented by six large, acute, radiating ribs with broad, concave interspaces; besides these the whole surface is cancellated by minute lines; color brownish-white, ornamented by a few reddish-brown, revolving bands, one much larger than the rest, in the middle of the whorl; aperture narrow, columella

very slightly twisted; outer lip acute, sinus almost obsolete. Long., .34; lat., .1; long. aper., .15 in. (Gabb.)

TYPE in State Geological Survey, Mollusca Survey Cabinet, No. 425. Type locality, Catalina Island, California.

RANGE. Monterey to San Diego, California.

Described as *Mangilia hexagona.*

Cytharella aculea Dall, 1919

Proceedings of the United States National Museum, **56**:74.

Shell small, purple-brown, banded with white, or varicolored; nucleus of one and a half, loosely-coiled, smooth, nuclear and four subsequent whorls; axial sculpture of six, somewhat sigmoid rounded ribs continuous up the spire, with excavated, much wider interspaces, with fine axial striation, which slightly wrinkles the spirals; spiral sculpture of numerous sharp, often paired grooves separated by wider flattish interspaces, which are faintly marked by the axial striation; aperture narrow, anal sulcus conspicuous, outer lip thickened, smooth inside, pillar simple, canal hardly differentiated. Height of shell, 6; of last whorl, 3.5; diameter, 2 mm. (Dall.)

TYPE in United States National Museum, No. 73994. Type locality, San Diego, California.

RANGE. San Diego, California, to Cape San Lucas, Lower California.

Cytharella hippolita Dall, 1919

Proceedings of the United States National Museum, **56**:76; Pl. 22, figs. 6, 8.

Shell small, slender, whitish, dark brown, or spirally banded with brown and white; nucleus with a very small, blunt, apical whorl, the succeeding whorl (worn in the specimens) probably feebly sculptured; subsequent whorls about five, with an appressed suture; spiral sculpture of very fine spiral striae, perceptible under the magnification, becoming coarser toward the canal; axial sculpture (including the terminal varix) of seven strong ribs with wider interspaces, slightly protractive anteriorly, continuous up the spire around which they show a slight twist, and extending on the last whorl to the canal; aperture narrow, elongated, anal sulcus wide, shallow, outer lip thickened, smooth, internally, inner lip simple; canal hardly differentiated. Height of shell, 5.7; of last whorl, 3.5; diameter, 2 mm. (Dall.)

TYPE in United States National Museum, No. 127536. Type locality, shell drift, San Hipolite Point, Lower California.

RANGE. San Diego, California, to Lower California.

Cytharella victoriana Dall, 1897

Plate 11, fig. 7

Bulletin of the Natural History Society of British Columbia, No. 2, 13; Pl. 1, fig. 9.

Shell small, solid, brownish or livid purple, with six whorls; spire rather acute, nucleus worn, but apparently smooth, the succeeding whorls sculptured with strong, flexuous, discontinuous ribs, which cross from suture to suture; the interspaces are wider than the ribs, of which there are nine on the last whorl; suture distinct, somewhat appressed and undulated by the ends of the ribs; aperture long, narrow, with a wide, strong, anal notch, the outer lip strong and heavy; pillar smooth, canal short, not recurved. Length of shell, 7; max. diameter, 3 mm. (Dall.)

Type in United States National Museum. Type locality, near Victoria, Vancouver Island, B. C.

Range. Known only from type locality.

Cytharella amatula Dall, 1919

Proceedings of the United States National Museum, **56**:78; Pl. 21, fig. 2.

Shell small, pale waxen yellow, with occasional brown spots between the ribs, with about one and a half, smooth, white nuclear and about five and a half subsequent whorls; axial sculpture of (on the last whorl eight) stout protractively arcuate ribs with subequal or narrow interspaces not continuous up the spire, but extending from the suture over a slight shoulder to the canal; spiral sculpture of numerous, fine, sharp striae covering the shell (except on the anal fasciole) with flattish wider interspaces; there is a slight angle at the shoulder; aperture narrow, the outer lip infolded, the anal sulcus large, the canal hardly differentiated, pillar smooth. Height of shell, 6.5; diameter, 3 mm. (Dall.)

Type in United States National Museum, No. 127534a. Type locality, San Diego, California.

Range. Known only from type locality.

Cytharella merita Hinds, 1843

Proceedings, Zoölogical Society of London, 42. *Zoölogy of the Voyage of H.M.S. Sulphur, Molluscae;* Pl. 6, fig. 20, 1844.

Testa ovata, turra, acuminata, laevigata pallida; anfractibus senis, plico-costulatis, superne angulatis et linea fusca spiraliter cinctis; sutura simplici; anfractus ultimi dorso fusco nebuloso, transversim striato; labro acuto, intus laevi; apertura oblonga; canali subnullo. Axis 4 lin. (Hinds.)

Shell shortly plicately ribbed, transversely striated, angulated next the suture; yellowish, back of last whorl clouded with brown, with a brown line on the shoulder-angle. Length, 12 mm. (Tryon, *Manual of Conchology.*)

TYPE in British Museum? Type locality, Gulf of Nicoya, Central America.

RANGE. Monterey, California, to Gulf of Nicoya, Central America.

Subgenus AGATHOTOMA Cossman, 1889

Cytharella fusconotata Carpenter, 1864

Annals and Magazine of Natural History, series 3, **14**:46.

C. testa parva, satis turrita, tenui, albida; postice linea, seu serie macularum, rufo-fusca, interdum altera peripheriali ornata; marginibus spirae rectioribus; anfr. nucl. ii., rotundatis, apice mamillato; norm. vi., in spira rotundatis, suturis impressis; basi satis rotundata; costis radiantibus circ. ix., acutis, distantibus, antice et postice subobsoletis; toto superficie spiraliter sulcata, sulculis subdistantibus, undatis, costas superantibus; apertura subovali, satis elongata, postice valde sinuata; labro acuto, dorsaliter costulato, intus haud dentato; labio tenui. Long., .36; long. spir., .18; lat., .16 poll. (Carpenter.)

TYPE in United States National Museum. Type locality, Cape San Lucas, Lower California.

RANGE. Laguna Beach, California, to Gulf of California.

Cytharella janira Dall, 1919

Plate 19, fig. 7

Proceedings of the United States National Museum, **56**:75; Pl. 21, fig. 10.

Shell small, acute, white or waxen, with a small smooth nucleus of about two whorls and five, subsequent, moderately rounded whorls; suture distinct, hardly appressed; spiral sculpture of sharp striae with wider minutely striated interspaces, over the whole surface, not swollen where they pass over the ribs; the whorls are slightly shouldered, there are about three or four of the strap-like interspaces on the spire between the shoulder and the succeeding suture, behind the shoulder they are less obvious and the sculpture is less coarse; on the last whorl the sculpture is quite uniform; axial sculpture of nine or ten protractively oblique slightly sigmoid ribs which nearly reach the canal and on the spire extend from suture to suture; aperture narrow, the anal sulcus wide and shallow;

close to the suture, the outer lip is thickened but not internally lirate; the inner lip smooth; the canal is short, wide, and hardly differentiated from the rest of the aperture. Height of shell, 9; of last whorl, 6; diameter, 3 mm. (Dall.)

TYPE in United States National Museum, No. 55285. Type locality, San Diego, California.

RANGE. San Diego, California, to Scammons Lagoon, Lower California.

Cytharella pomara Dall, 1919

Proceedings of the United States National Museum, **56**:305.

Shell small, fusiform, solid, with six moderately convex whorls, the nucleus small, subglobular, smooth (slightly decorticated); axial sculpture of (on the penultimate whorl, 11; on the last whorl, 9) prominent, slightly-shouldered ribs with wider interspaces, the ribs undulating the appressed suture; spiral sculpture of close-set alternated threads over the whole surface except between the shoulder and the suture, which is arcuately striated by the incremental lines; aperture narrow, straight, the anal sulcus moderate, the outer lip thickened, simple, the inner lip with a wash of enamel; the canal hardly differentiated. Height of shell, 7; of aperture, 4; diameter, 3 mm. (Dall.)

TYPE in United States National Museum, No. 152746. Type locality, San Pedro, California.

RANGE. Known only from type locality.

Cytharella densilineata Dall, 1920

Paleontology of San Pedro, California.

New name for *Mangilia striosa* in *Paleontology of San Pedro, California,* not C. B. Adams.

Shell small, elongate-fusiform; spire much elevated; apex acute; whorls six, subangular, with numerous fine, slightly wavy transverse ridges, which become obsolete at the sutures; spiral sculpture nearly obsolete; suture very deeply depressed, giving a rather frail appearance to the spires; aperture narrow, elliptical, tapering anteriorly to a short, truncated canal; posterior sinus small; outer lip thin, simple, arcuate; columella smooth; straight on anterior portion. Long., 9.2; lat., 3; body-whorl, 5.2; aperture, 4 mm. (Arnold.)

TYPE in United States National Museum? Type locality?

RANGE. San Pedro, California, to Gulf of California. Fossil: Pleistocene, San Pedro, San Diego, California.

Genus **DAPHNELLA** Hinds, 1844

Shell fusiform, thin, fragile, usually striated; aperture elongated oval, canal very short. Small and elegant shells of slight thickness, distinguished from *Defrancia* by their elongated body-whorl, tenuity and sculpture. No operculum. (Tryon, *Structural and Systematic Conchology.*)

TYPE. *Daphnella limnaeiformis* Kiener.

DISTRIBUTION. California to Gulf of California.

Daphnella fuscoligata Dall, 1871

American Journal of Conchology, 7: 100. Tryon, *Manual of Conchology,* 6; Pl. 34, fig. 95.

Shell fusiform, slender, solid, of four or five whorls; spire half as long as the shell, aperture the same; the latter narrow, with no perceptible sinus, and a short open canal; columella and outer lip smooth; sculpture consisting of strong, revolving, elevated lines, six on the last whorl, crossed by strong, regular, longitudinal costae of about the same size, twelve on the last whorl. These ridges are remarkably uniform, and their intersections produce a very conspicuously regular reticulation. The longitudinal ridges are, perhaps, a little thicker on the convexity of the whorls than above and below. General coloration white, with a reddish-brown band between the suture and the first revolving ridge, another between and including the third and fourth ridges, the other revolving ridges being dotted with brown between their intersections with the costae. These intersections, especially on the last whorl, appear somewhat nodulous. Long., .29; lat., .13 inch. (Dall.)

TYPE in United States National Museum. Type locality, Monterey, California.

RANGE. Monterey to San Diego, California.

Daphnella clathrata Gabb, 1865

Proceedings of the California Academy of Sciences, 3: 185.

D. t. parva, fusiformis, tenuis; anfra. iii. nucleosis, laevibus; anfra. normalibus iii.+ supra oblique truncatis; superficie confertim clathrata; striis radiantibus obsoletis circa basim; apertura magna; columella parum tortuosa; labio parum incressato; labio acuto; sinu postico sub-profundo, supra acuto, ad suturam attingente; colore albido, sparsim brunuco punctato. Long., .37; lat., .14; long. aper., .22. (Gabb.)

Shell small, fusiform, thin, aperture longer than the spire; nuclear whorls three, smooth: normal whorls three or more, obliquely truncated above, convex below, this truncation is partially obsolete on the last

whorl; surface closely clathrate, except on the lower part of the last whorl where the radiating lines become obsolete; aperture large, columella somewhat twisted, slightly encrusted; outer lip thin, acute, posterior sinus moderately deep and narrow, adjoining the suture and angular at its upper corner; color, brownish-white with minute brown spots sparsely scattered, usually placed on the larger of the revolving ribs. (Gabb.)

TYPE in Survey Cabinet, Mollusca, No. 1053. Type locality, Santa Catalina Island in 60 fathoms. (Dr. Cooper.)

RANGE. San Miguel Island to San Diego and Cortez Bank, California.

Genus **TARANIS** Jeffreys, 1870

Shell minute, cancellated; whorls angulated; slightly exserted at base; aperture pyriform; outer lip thin, simple; sinus obsolete; canal short. (Arnold.)

TYPE. *Taranis mörchi* Malm.

DISTRIBUTION. Alaska to San Diego, California. Fossil: Pleistocene, San Pedro, California.

Taranis strongi Arnold, 1903

Paleontology of San Pedro, California, 215; Pl. 9, fig. 7.

Shell small, elongated; spire elevated; apex mammilliform; whorls six, angulated near middle, upper surface concave, lower surface convex; two strong spiral ridges, one on angle, the other in middle of lower portion of whorl; incremental lines visible; suture impressed, distinct; aperture subovate, oblique; outer lip thin, slightly arcuate anteriorly; inner lip smooth; posterior sinus broad, very shallow; anterior sinus short; columella short and distinct. Long., 12; lat., 5.5; body-whorl, 7; aperture, 5 mm. (Arnold.)

TYPE in United States National Museum. Type locality, Lower San Pedro series, Deadman Island.

RANGE. Forrester Island, Alaska, to San Diego, California. (Recent.) Fossil: Pleistocene, San Pedro, California.

Fossil: Pleistocene, San Pedro, California.

Family CANCELLARIIDAE

Genus **CANCELLARIA** Lamarck, 1799

Shell cancellated; aperture channeled in front; columella with several strong oblique folds; no operculum. The animals are vegetable feeders.

TYPE. *Cancellaria reticulata* Linnaeus.

DISTRIBUTION. West Indies, Mediterranean, W. Africa, India, China, California. Fossil: Upper Chalk.

Subgenus PROGABBIA Dall, 1918

Cancellaria cooperi Gabb, 1865

Plate 11, fig. 14

Proceedings of the California Academy of Sciences, 3: 186. Tryon, *Manual of Conchology,* 7; Pl. 4, fig. 65, 1885. *Bulletin 112,* United States National Museum; Pl. 5, figs. 3, 4.

Broadly subfusiform, nuclear whorls two, smooth, round; normal whorls seven, subangulated, concavely excavated above the angle; angle acutely tuberculated; below the angle the surface is ornamented by about twelve slightly oblique ribs each rib ending in a tubercle at the upper angle; the whole surface ornamented, besides these ribs, by small, closely-placed, revolving ribs; color yellowish-brown crossed by about a dozen brown revolving bands; these bands usually cover the larger of the concentric ribs; canal elongate, columella but slightly twisted; umbilicus obsolete; inner lip but slightly encrusted, bearing two sharp oblique folds; outer lip acute simple. (Gabb.)

Height of shell, 80; of last whorl, 50; of aperture, 41; width of last whorl, 36 mm. (Oldroyd.)

TYPE in Geological Survey, Mollusca Survey Cabinet, No. 463. Type locality, San Diego, California.

RANGE. Monterey, California, to Coronado Islands.

Cancellaria io Dall, 1896

Proceedings of the United States National Museum, 18: 14. *Bulletin,* Museum of Comparative Zoölogy, 43, No. 6; Pl. 1, fig. 2.

Shell fusiform, solid, whitish or pink, with a more or less olivaceous epidermis, and about six whorls; spire pointed, whorls rounded, somewhat constricted in front of the suture, which is appressed; sculpture of numerous flattened spiral threads, with about equal interspaces, uniform over the whole surface, but with occasional finer intercalary threads; these are crossed by (on the last whorl about 13) rather stout, rounded ribs, strongest at the shoulder, obsolete beyond the periphery, and not reaching the suture behind them; aperture rather long, outer lip simple, smooth, not reflected or lirate; pillar rather straight, with three strong plaits; canal shallow, wide, pointed, making no perceptible fasciole; umbilicus none; body whorl with a thin wash of callus. Height of shell,

43; of last whorl, 33; of aperture, 25; width of last whorl, 21 mm. (Dall.)

TYPE in United States National Museum. Type locality, U.S. Fish Commission Station 3354, in 322 fathoms, Gulf of Panama.

RANGE. San Diego, California, in 650 fathoms, to Gulf of Panama, in 322 fathoms.

Cancellaria corbicula Dall, 1906

Bulletin, Museum of Comparative Zoölogy, **43,** No. 6:294; Pl. 1, fig. 4.

Shell small, thin, milk-white, with a thin pale-yellow periostracum, and about six whorls besides the blunt (decollate) nucleus; form bulimoid, aperture nearly equal to the spire in length; whorls evenly rounded, with a strongly marked suture; sculpture between the sutures of seven to nine flattish revolving threads with slightly wider channeled interspaces; these are crossed by numerous, subequally spaced, very narrow, low, slightly arcuate axial ridges, slightly nodulous at the intersections; there are also very numerous, prominent, incremental lines in the interspaces; aperture oval, outer lip smooth, entire, reflected; inner lip with a thin callus coat of enamel, continuous with the outer margins; pillar short, axis imperforate, with two strong oblique plaits near the proximal end of the pillar; canal obsolete. Length of shell, 21.5–26; of last whorl, 16; of aperture, 10.5; max. diam., 9.5 mm. (Dall.)

TYPE in United States National Museum. Type locality, U.S.S. "Albatross" Station 2936, off San Diego.

RANGE. Santa Barbara Islands to Coronado, Islands.

SECTION CRAWFORDIANA Dall, 1919

Cancellaria crawfordiana Dall, 1891

Proceedings of the United States National Museum, **14**:182; Pl. 6, fig. 1.

Shell elongated, slender, with six moderately rounded whorls, reticulately sculptured and covered when fresh with a rather coarse brown fibrous epidermis; whorl transversely sculptured with from fourteen to twenty narrow, clear-cut, moderately elevated, even, slightly flexuous ribs, crossing the whorls, but less prominent anteriorly and separated by wider interspaces. The only other transverse sculpture is of lines of growth; spiral sculpture of (between the sutures nine to ten) narrow, flat-topped, strap-like elevated cinguli, with wider excavated interspaces, rather uniformly spread over the whorl, but more distant near the shoulder, and on the earlier whorls somewhat sharper and relatively more prominent.

Between the cinguli, and rarely on them, are a few obscure, revolving lines. On the canal the cinguli become rounded, smaller and obscure. The surface under the dehiscent epidermis is polishd pale brown, with a somewhat chalky substratum easily eroded. The upper whorl or two have lost most of this layer in the specimen figured and the nucleus is lost. The suture is deep, but not channeled. The canal has no constriction behind it. The aperture is rather long, the outer lip but slightly reflected and a little fluted by the spiral sculpture. Inside there are a few faint and obscure lirae. The throat is pure white; the thin body callus, tinged with pale-pinkish brown. The anterior angle of the aperture is nearly canaliculate, and produces a perceptible siphonal fasciole. The pillar is straight and strong, with two plaits; the posterior stronger, both oblique and rather low. The angle of the edge of the pillar, though not elevated, might by some be taken as an obscure third plait. At the end of the plaits on the callus of the pillar are a number of small shelly pustules like on *C. cassidiformis*. Long. of shell, 43; max. alt., 21 mm. (Dall.)

TYPE in United States National Museum. Type locality, Drake's Bay, near San Francisco, California.

RANGE. Bodega Bay to San Diego, California.

Subgenus SVELTIA Jousseaume, 1888

Cancellaria modesta Carpenter, 1865

Annals and Magazine of Natural History, series 3, **15**: 32.

Testa elata, subrufa, trichotropiformi, marginibus spirae rectis; anfr. norm. v., rotundatis, postice subtabulatis, suturis impressis; costis spiralibus obtusis, distantibus, inspira circ. iv., circa basim prolongatam circ. vii., aliis minoribus interdum intercalantibus; interstitiis secundum incrementa, decussatis; apertura subquadrata; columella plicis duabus declivibus anticis et costulis basalibus ornata; labio nullo. Long., .68; long. spir., .34; lat., .34 in. (Carpenter.)

Shell elevated, reddish, margins of the spire straight; whorls normal or rotund, subtabulate in the rear, with impressed sutures, with obtuse spiral ribs, distant, about four to a whorl, on the body-whorl about seven, frequently with smaller ones intercalated; with channels, crossed by growth lines; aperture subquadrate, with two inclined plications in front, and a minute basal rib.

TYPE in United States National Museum. Type locality, Neah Bay, Washington.

RANGE. Aleutian Islands, Alaska, to Neah Bay, Puget Sound.

Cancellaria unalaskensis Dall, 1873

Proceedings of the California Academy of Sciences, 5:58; Pl. 2, fig. 1.

Shell slender, acute, of six whorls, with a minute, smooth, white nucleus and solid texture. Color whitish with traces of a nut-brown epidermis. Sculpture of strong revolving ribs, of which the posterior three are crossed by rather strong transverse riblets which rise into beaded nodules on the intersections. The whorls are turreted by the prominence of the posterior revolving rib, between which and the suture the transverse riblets are oblique and rather strong. Three of the revolving ridges are apparent on the upper whorls and seven on the last whorl. Aperture about two-fifths the whole length, white, with a pink throat, and the outward lip somewhat thickened and internally grooved, corresponding with the external ridges, which are also apparent on the inner lip. Canal short, straight, shallow and rather narrow. Two or three plicae on the columella. Long., 0.75; lat., 0.3 in. (Dall.)

TYPE in United States National Museum. Type locality, 30–60 fathoms in Captain's Harbor, Unalaska, Aleutian Islands.

RANGE. Unaslaska, Alaska, to Cape Blanco, Oregon.

Cancellaria circumcincta Dall, 1873

Proceedings of the California Academy of Sciences, 5:59; Pl. 2, fig. 2.

Shell similar in form to the last, with six whorls, nucleus minute and nearly smooth; thin and delicate; whorls sculptured with strong revolving ridges, generally subequal, but with a few more slender intercalary threads; turns gently rounded with a very slight tendency to tabulation toward the posterior third of the whorl; crossed by very faint transverse irregular riblets, which are most evident on the apical whorls and evanescent on the body whorl, and show a slight tendency to granulation at the intersections only on the first two or three whorls. Color rose-pink, strongest on the ridges. Outer lip thin, delicate, the sculpture of the exterior showing through; inner lip not thickened; columella white, with two or three very faint plicae. Canal short but deeper than in the last species. Long., .82; lat., .37 in. (Dall.)

TYPE in United States National Museum. Type locality, Popoff Strait, Shumagin Islands.

RANGE. Unalaska to Point Etches, Alaska.

Genus **ADMETE** Kroyer, 1842

Shell oval, thin, diaphanous, covered by a thin epidermis; spire sharp; last whorl ventricose; aperture oval, feebly channeled in front; colum-

ella arcuated, obliquely truncated, with rudimentary plications; outer lip sharp.

TYPE. *Admete viridula* Fabricius.

DISTRIBUTION. East and west coast of North America. (Tryon, *Manual of Conchology.*)

Admete middendorffiana Dall, 1884

Proceedings of the United States National Museum, 7:524; **24**; Pl. 38, fig. 6, 1902.

This form is perfectly distinct from *A. viridula,* and may prove to be a *Cancellaria.* It is one of the characteristic forms of the Pacific Arctic and ranges north from Nunivak Island. The present specimen was obtained in 5 fathoms mud, in Norton Sound. (Dall.)

TYPE in United States National Museum, No. 40961. Type locality, Nunivak Isand, Arctic.

RANGE. Arctic coast of Alaska to Bristol Bay, Bering Sea.

Admete regina Dall, 1911

Nautilus, **25**:16.

Shell large, solid, white, with a coffee-colored periostracum and five or more whorls, the apex in every case being more or less eroded; spiral sculpture of fine, even-channeled grooves, with flattened or even slightly concave wider interspaces covering the whole shell except a space between the suture and the shoulder of the whorls; there are about two grooves and an interspace to a millimeter; axial sculpture of a few feeble, often more or less obsolete, irregular, low plications, not quite reaching the middle of the whorl; suture very deep but not channeled; whorls moderately rounded; base attenuated with a narrow, deep umbilical perforation; outer lip simple, hardly thickened, throat white, smooth, body with a smooth, white layer of callus; pillar concavely arcuate, with six or more feeble plaits, the anterior end of the pillar projecting over a deep notch. Height of shell, 36; of last whorl, 27; of aperture, 20; max. diam., 22 mm. (Dall.)

TYPE in United States National Museum, No. 221473. Type locality, Plover Bay, Bering Sea, 25 fathoms.

RANGE. Arctic Sea to Pribilof Islands.

Admete rhyssa Dall, 1919

Proceedings of the United States National Museum, **56**:306.

Shell small, white, with an olivaceous periostracum, a loosely coiled (decorticated) nucleus, and about four subsequent whorls separated by a

distinct suture; axial sculpture of (on the last whorl, a dozen) rather narrow, nearly vertical ribs, which extend from suture to suture on the spire and from the suture to the margin of the base in the last whorl, with wider interspaces; incremental lines rather marked; spiral sculpture of (on the spire, four; on the last whorl, eight) prominent threads with wider interspaces, overriding the ribs and coming to a node when they intersect them; the base nearly smooth except for one or two minor threads near the canal; aperture semilunate, the outer lip thin, body with a thin layer of enamel; pillar with three oblique plaits, canal shallow, short, with a faint fasciole. Height of shell, 7; of last whorl, 5; diameter, 4.5 mm. (Dall.)

TYPE in United States National Museum, No. 211241. Type locality, United States Bureau of Fisheries Station 4343, off South Coronado Island.

RANGE. Santa Rosa Island, California, to S. Coronado Island. Also Pleistocene.

Admete microsoma Dall, 1908

Bulletin, Museum of Comparative Zoölogy, **43**:296; Pl. 11, fig. 10.

Shell small, thin, covered with a pale-brownish periostracum, with about five tabulate whorls beside the (lost) nucleus; suture distinct, not channeled; whorl in front of it flattened, beyond the keel at the shoulder moderately rounded; axial sculpture of lines of growth which are at intervals so prominent as to suggest faint ribs; spiral sculpture comprising a marked keel at the shoulder, minutely undulate by the axial riblets, and followed by a wide interval; about eight less prominent spiral threads, separated by successively narrower intervals with microscopic intercalary threads, covering the whole base; aperture ovate, outer lip thin, simple, sharp; body smooth; pillar straight, short, thin, with two plaits, the anterior of which forms the edge of the columella; anterior part of aperture with a distinct, but not deep rounded notch. Long. of shell, 3.5; of last whorl, 2.5; of aperture, 1.7; max. diam., 1.8 mm. (Dall.)

TYPE in United States National Museum. Type locality, Station 3418, off Acapulco, Mexico, in 660 fathoms.

RANGE. North Coronado Island (656 fathoms) to Acapulco.

Admete couthouyi Jay, 1839

Plate 16, fig. 2

Catalogue of Collections, 77. *Boston Journal of Natural History,* **2**; Pl. 3, fig. 3.

Shell ovate-conical, somewhat turreted, milky-white, approaching to horn-color; whorls five or six, convex, flattened at the top; suture well-

defined, somewhat profound; apex acute, the anterior whorl composing two-thirds the length of the shell; surface marked with distinct lines of growth, and sometimes rising into folds near the suture; coarse revolving lines surround it, which, with folds, form a net-work; aperture half the length of the shell, oval; outer lip sharp, slightly crenulated by the revolving lines; inner lip arched with three inconspicuous, oblique folds, of which the middle one is largest; a thin coating of enamel spreads upon the anterior whorl in mature specimens; base sub-channeled. Length, 11/20; breadth, 7/20 in. (Gould.)

This was first described by Mr. Couthouy under the name of *C. buccinoides,* a name previously given to a species from the Pacific by Mr. Sowerby; on which account Dr. Jay has since applied to it the name of its first describer. (Gould.)

TYPE in State Collection, No. 25, Society Cabinet, No. 2368, Boston Society. Type locality, Massuchetts Bay.

RANGE. Arctic Sea to San Diego, California. Circumboreal.

Admete couthouyi laevior Leche, 1878

Kongligé Svenska Vetenskaps Akademie Handlingerm, **16**:43.

Har inga eller endast antydningar till tvarveck. Long., 22½; lat., 11½ mm. (Leche.)

Shell larger than the typical, smoother; suture not as distinct; whorls rounded.

TYPE in? Type locality, Arctic.

RANGE. Arctic Ocean to Sea Lion Rock, Washington, and off San Juan Islands, Puget Sound.

Admete couthouyi gracilior Carpenter, 1866

Gabb, *Paleontology of California,* **2**:50.

C. t. elongata, gracili, elegantissima; anfr. nucleosis ii, majoribus, valde declivibus, laevibus, apice immerso; norm. v tumentibus, superne vix subangulatis, suturis valde impressis; costis radiantibus x rotundatis, ad basim obsoletis, interstitiis undatis, majoribus; lirulis spiralibus exiguis, subdistantibus, supra costes et interstitia eleganter transeuntibus, postice ii minoribus, in medio primum iii, postea vi crebrioribus, circea basim attenuatam vi lineis distantibus; apertura subquadrata, antice dilatata; labro acuto; labio inconspicuo; columello plicis ii minoribus, declivibus, antice torta plicae tertiae simulante, sed vix emarginata. Long., .35; long. spir., .21; lat., .16 in. (Carpenter.)

Shell elongate, slender, very elegant; with two nuclear whorls, quite large, strongly sloping, smooth, with covered apex; 5 swollen, above scarcely subangulate, with sutures strongly impressed; with 10 larger rotund radial costae, at the base obsolete, with wavy interstices; with a few spiral lirulae, somewhat distant, crossing gracefully over the ribs and interstices, in the rear 2 smaller, in the middle at first 3, afterward 6 more frequent, around the attenuated base six distant lines; aperture subquadrate, in front dilated; outer lip acute; inner lip inconspicuous; columella with 2 smaller oblique plications, inserted in front, like a tertiary fold, but scarcely emarginate. (Translation.)

TYPE in? Type locality, Santa Barbara, California, Post-Pliocene.

RANGE. Arctic Sea to San Diego, California. Fossil: Pleistocene of California.

Admete californica Dall, 1908

Plate 11, fig. 6

Bulletin, Museum of Comparative Zoölogy, **43**, No. 6: 296; Pl. 4, fig. 4.

Shell thin, turreted, with five whorls beside the nucleus; white, with a pale, olivaceous periostracum; nucleus blunt, turgid, of about a whorl and a half, smooth but not polished; subsequent whorls with a prominent angular shoulder, above which the whorl is tabulate, the angulation becoming obsolete in the last whorl of the adult shell; in the early whorls the space between the angle and the suture behind it is nearly smooth and flat, later it has faint spiral threads and becomes more convex; axial sculpture of numerous (on the penultimate whorl, about twenty) low rounded ribs, with shallow, subequal interspaces, strongest at the angle, obsolete on the tabulation and on the last whorl, extending on the spire to the succeeding suture; the incremental lines are also rather conspicuous; spiral sculpture in front of the angle of (on the spire, about four, on the last whorl, about 20) low, rounded, subequal, spiral threads with wider interspaces, a little turgid where they cross the ribs, especially on the spire, and more crowded on the last whorl, anteriorly, where they extend to the brink of the umbilicus; aperture subtriangular, the outer lip thin, not reflected; body with a thin wash of callus; pillar thin, straight, with three plications, the middle one strongest; canal obsolete or none; umbilicus rather large, funicular, its walls vertically striate, the opening partly concealed by the pillar lip; in the young the umbilicus is relatively much smaller; operculum absent. Length of shell, 16; of last whorl, 11; of aperture, 8; max. diam., 8.3 mm. (Dall.)

TYPE in United States National Museum, No. 110626. Type locality, U.S.S. "Albatross" Station 2980, in 603 fathoms.

RANGE. Tillamook, Oregon, to Gulf of California.

Admete woodworthi Dall, 1905

Nautilus, **18**:123.

Shell small, thin, whitish, with a yellowish-brown periostracum, five normal, sculptured, and one smooth, turgid nuclear whorl, gradually increasing, subtabulate by a prominent spiral thread at the shoulder while young, rounded at the last whorl, with 8 or 9 obscure riblets on the upper part of the spire, which are obsolete on the last whorl and a half; spiral sculpture of rounded threads, with wider flattish, somewhat irregular interspaces; periostome continuous with a slight notch or sulcus near the end of the nearly straight pillar, and with no umbilicus; there are two obscure plaits on the pillar, which is not marked by any umbilical chink or fissure; aperture with the external sculpture modifying the margin, but no lirations. Lon. of shell, 9; of aperture, 4; max. diam., 4.5 mm. (Dall.)

TYPE in United States National Museum. Type locality, Monterey Bay, in 10–45 fathoms.

RANGE. Monterey Bay, Santa Barbara Islands.

Family OLIVIDAE

Genus **OLIVELLA** Swainson, 1840

Shell polished, small; spire produced, acute, suture canaliculated; aperture narrow behind, enlarged anteriorly; columella plicated in front; callous posteriorly. Operculum horny, thin, half ovate, with apical nucleus. *Olivella* is distinguished from *Oliva* by the small size of the shell, its more produced spire, the presence of a large, thin, horny operculum, and the want of eyes. (Tryon, *Structural and Systematic Conchology.*)

TYPE. *Olivella undatella* Lamarck.

DISTRIBUTION. North Carolina, West Indies, West Coast of America, Senegal, China, Philippines, Australia, Polynesia. Fossil: Pleistocene, Pliocene.

Olivella biplicata Sowerby, 1825

Plate 26, figs. 20, 20*a*

Tankerville *Catalogue,* Appendix 33. Tryon, *Manual of Conchology,* **5**; Pl. 34, fig. 58.

Testa ovali, griseo-fulvescente, longitudinaliter substriata, laevi; spira subacuminata, sutura, subfusca; columella laevi, superne callosa, ad basim biplicata; apertura, columellae basi, cinguloque basali violaceo tinctis. Long., 1; lat., 6/10 inc. (Sowerby.)

Shell abbreviately ovate, thick, stout, slightly striated longitudinally, spire short, columella arched, smooth, callous at the upper part, two-plaited at the base, aperture effused at the base; bluish-gray, sutures brown, columella and base deep violet; aperture, blue-gray, violet at the edge. (*Conchologia Iconica.*)

TYPE in Museum Cuming. Type locality, Monterey, California.

RANGE. Monterey to San Diego, California. Fossil: Pliocene of Deadman Island, San Pedro, California.

Olivella biplicata angelina T. S. Oldroyd, 1921

Plate 26, figs. 17, 17*a*

Nautilus, **34**; Pl. 5, fig. 6.

This variety differs from Sowerby's type in being more delicate and slender, with callus not so heavy, spire more elevated, sloping more gradually from the middle of the shell to the apex. Sowerby's type came from Monterey and does not occur near San Pedro, living, but is found fossil there in the Pliocene and lower Pleistocene. Length of type, 27; width, 13 mm. (T. S. Oldroyd.)

TYPE in Oldroyd Collection, Stanford University. Type locality, Los Angeles County, California.

RANGE. San Pedro to San Diego, California.

Olivella biplicata fucana T. S. Oldroyd, 1921

Plate 26, figs. 23, 23*a*

Nautilus, **34**:118; Pl. 5, fig. 4.

Shell broader across the middle and lower part of the aperture, than *var. angelina,* spire running more sharply to a point from the middle of the shell. Color more uniform, being a light drab. Length, 28; breadth, 14 mm. (T. S. Oldroyd.)

TYPE in Stanford Collection. Type locality, Straits of Juan de Fuca.

RANGE. British Columbia, Vancouver Island, to Straits of Juan de Fuca. Fossil: Pliocene at San Pedro.

Olivella biplicata lapillus Vanatta, 1915

Nautilus, **29**:71. Sowerby, *Thesaurus Conchyliorum,* **4**; Pl. 18, fig. 290.

Shell globose, white, spire short, interior of the aperture cream-colored. Alt., 24; diam., 14 mm. (Vanatta.)

TYPE in Philadelphia Academy of Natural Sciences, No. 111977. Type locality, San Pedro, California.

RANGE. San Pedro to San Diego, California.

Olivella biplicata parva T. S. Oldroyd, 1920

Plate 26, figs. 16, 16*a*

This variety is nearest *angelina,* but much smaller, a little broader in proportion; outer lip more curved, shell more highly colored and variable in color. (T. S. Oldroyd.)

TYPE in Oldroyd Collection, Stanford University. Type locality, Point Abreojos, Lower California.

RANGE. Living, Lower California; fossil,* Lower Pleistocene, San Pedro, California.

Olivella porteri Dall, 1910

Nautilus, **23**:133.

Whorls about seven, spire acute with a very deep and narrow channeled suture not obscured by callus; surface of the whorl brilliantly polished, smooth, except for microscopic spiral close striation which is present on all, but more uniform on particular individuals; color pale olive, yellow, or whitish, with sharp angular axial brown lines superposed between the suture and the basal fasciole, sometimes forming a tent-like pattern and sometimes reduced to fine, close, more or less cloudy zigzags; a pale band in front of the suture, usually with a vivid brown zigzag pointed forward, but sometimes plain, the brown lines when present broader and stronger than elsewhere; basal fasciole short, with a marginal and an adjacent narrow fold or plait anteriorly, lighter than the body, yellow or rich bluish-purple; aperture narrow, simple, with a deep sutural sinus and a moderate parietal callus when mature. Height of shell, 15; of aperture, 9 mm. (Dall.)

TYPE in United States National Museum, No. 209677. Type locality, San Diego, California.

RANGE. Redondo, California, to Magdalena Bay, Lower California.

Olivella pedroana Conrad, 1855

Pacific Railroad Reports, **5**:327; Pl. 6, fig. 51.

Small, elliptical; spire conical, about equal in length to the aperture; base of columella with a prominent fold. A small abundant species, sometimes water-worn, without any prominent character, except the fold at the base, which is more conspicuous, considering the size of the shell, than is usual in the genus. (Conrad.)

TYPE in ? Type locality, San Pedro, California.

RANGE. Puget Sound to Cape San Lucas, Lower California.

Olivella boetica Carpenter, 1863

Plate 26, figs. 19, 19*a* and 22, 22*a*

Supplementary Report, British Association for the Advancement of Science, 661.

Narrow, dull, thin; has been erroneously called *amazora, tergina, petiolita.* (Carpenter.)

Spire moderately elevated, sharp-pointed, body-whorl oval; red-brown or gray, fasciculated upon a white band at the suture; body-whorl maculated or with zigzag markings and sometimes a white central band, fasciole white, tip of spire frequently dark-tinted. Length, .75–1 in. (Tryon, *Manual of Conchology.*)

TYPE in Philadelphia Academy of Sciences. Type locality, San Diego, California.

RANGE. Kodiak Island, Alaska, to Cape San Lucas, Lower California.

Olivella boetica diegensis T. S. Oldroyd, 1921

Plate 26, figs. 18, 18*a*

Nautilus, **34**:118; Pl. 5, fig. 2.

This differs from the typical shells of British Columbia, in the color being a light drab, sometimes mottled; not as oval in outline, spire longer and running more sharply to a point. Length, 19; breadth, 8 mm. (T. S. Oldroyd.)

TYPE in Oldroyd Collection, Stanford University. Type locality, Pleistocene, upper San Pedro, California.

RANGE. San Pedro to San Diego, California.

Olivella boetica mexicana T. S. Oldroyd, 1921

Plate 26, figs. 21, 21*a*

Nautilus, **34**:118; Pl. 5, fig. 3.

This differs from *pedroana* in being smaller, more slender, spire not running quite as sharply to a point. Length, 10; breadth, 4 mm. (T. S. Oldroyd.)

TYPE in Oldroyd Collection, Stanford University. Type locality, Scammon's Lagoon, Lower California.

RANGE. San Pedro, California, to Scammon's Lagoon, Lower California. Fossil: Pleistocene, upper San Pedro Series, San Pedro, California.

Family MARGINELLIDAE

Genus **MARGINELLA** Lamarck, 1799

Shell ovately oblong to subcylindrical, smooth, polished, sometimes longitudinally ribbed; spire short-conical or concealed; aperture narrow,

elongated, obtuse or truncated in front; columella plicate; outer lip with a thick marginal varix, its inner margin smooth or crenulated. (Tryon, *Structural and Systematic Conchology.*)

TYPES. *Marginella nubeculata* and *Marginella persicula.*

DISTRIBUTION. Tropical and subtropical; Caribbean West Africa, Indo-Pacific, east and west coasts of America, Brazil, China, West Indies. Fossil: Cretaceous (?), Eocene—; United States, Europe, Australia.

Marginella jewettii Carpenter, 1856

Proceedings, Zoölogical Society of London, 207. Tryon, *Manual of Conchology,* **5**; Pl. 12, fig. 57.

M. t. parva, alba, ovoidea; spira depressa, celata, antice angustiore, postice tumidiore; labro vix incressato, medio inflexo, supra calloso, callositate suturam et anfr. penult. tegente; labio iv-plicato, et supra dentato. Long., .18; long., spira. (super sutram), .03; lat., .12. (Carpenter.)

Marginella with small shell, white, ovoid; spire depressed, suture concealed, in front rather narrow, in the rear more tumid; outer lip scarcely thickened, in the middle inflated, above callous, with the callus covering the suture and last whorl; inner lip quadriplicate, and dentate above. (Translation.)

TYPE in British Museum. Type locality, Santa Barbara, California.

RANGE. Monterey to San Diego, California.

Marginella subtrigona Carpenter, 1865

Annals and Magazine of Natural History, series 3, **15**: 397. Tryon, *Manual of Conchology,* **5**; Pl. 12, fig. 55.

M. testa *M. jewettii* simili, sed multo curtiore; antice valde angustata, postice valde tumente; labro postice minus prolongato; plicis iv., validioribus, parientali una. Long., 14; long. spir., .01; lat., .11 poll. (Carpenter.)

Like *M. jewettii,* but much shorter and wider. (Tryon, *Manual of Conchology.*)

TYPE in British Museum. Type locality, Santa Barbara, California.

RANGE. Monterey to San Diego, California.

Marginella regularis Carpenter, 1865

Annals and Magazine of Natural History, series 3, **15**: 398. Tryon, *Manual of Conchology,* **5**; Pl. 12. fig. 56.

M. testa *M. jewettii* simili, sed multo minore, paullum angustiore; tenui, nitidissima, crystallina, omnino diaphana; labio magis callosa. Long., .13; long. spir., .01; lat., .09 poll. (Carpenter.)

Thin, glassy white or yellowish; narrower than *M. jewettii;* lip-margin rather thick. (Tryon, *Manual of Conchology.*)

TYPE in British Museum. Type locality, Santa Barbara, California.
RANGE. Monterey to Gulf of California.

Subgenus HYALINA Schumacher, 1817

Marginella californica Tomlin, 1916

Nautilus, **29**:138. Arnold, *Paleontology of San Pedro, California;* Pl. 4, fig. 9.

Shell subcylindrical, smooth, vitreous and polished, yellowish-white, variously banded with chestnut; spire short and completely glazed over; whorls 4½; aperture narrow, dilated, below; columella sinuous, obliquely truncate, with four fairly strong, oblique plaits; outer lip thickened without; suture marked by a narrow white line. Length, 9; diameter, 4.5; length of aperture, 7 mm. (Tomlin.)

TYPE in the Tomlin Collection, England. Type locality, San Pedro, Calif.
RANGE. San Pedro, California, to Puerto Libertad, Mexico.
This species has been called *M. varia,* by California collectors.

Marginella myrmecoön Dall, 1919

Proceedings of the United States National Museum, **56**:308.

Shell minute, white, smooth, polished, with about three whorls forming a blunt spire, widest near the posterior commissure of the aperture, attenuated in front, sides moderately convex; suture obscure; aperture narrow, outer lip straight, slightly thickened; body with a wash of enamel, pillar with three plaits. Height of shell, 3.3; max. diam., 1. 6 mm. (Dall.)

TYPE in United States National Museum, No. 9440. Type locality, San Diego, California.
RANGE. Known only from type locality.

SECTION CYSTISCUS

Genus **CYSTISCUS** Stimpson, 1865

(See description in Appendix, p. 284.)

Cystiscus politulus (Cooper MS) Dall, 1919

Proceedings of the United States National Museum, **56**:307.

Shell minute, translucent white, of about two and a half whorls, the spire evident but covered with transparent enamel; it is widest posteriorly but does not attenuate rapidly enough to become pyriform; the aperture is nearly as long as the shell, the outer lip thickened, internally smooth, nearly straight; inner lip polished with three oblique plaits. Height of shell, 3; max. diam., 1.5 mm. (Dall.)

TYPE in United States National Museum, No. 23240. Type locality, Catalina Island, California.
RANGE. Santa Barbara, California, to Cape San Lucas, Lower California.

Cystiscus minor C. B. Adams, 1852

Panama Shells, 40. Tryon, *Manual of Conchology,* **5**; Pl. 12, fig. 65.

Shell ovate, white, or pale horn color, subtransparent; rather thin, smooth; spire slightly elevated; whorls about three (?) with a very indistinct suture; aperture linear; lip rather thin at the margin, thickened behind, posteriorly ascending the spire; columella with two well-developed plaits at the end, with a third one less developed, and sometimes with a fourth which is more or less indistinct. Length, .09; breadth, .063 in. (C. B. Adams.)

TYPE in Amherst College Collection. Type locality, Panama.

RANGE. San Pedro, California, to Panama.

Genus **CYPRAEOLINA** Cerulli-Irelli, 1911 (Marginella)

Shell minute, bulliform, spire sunken; aperture long, the outer lip sometimes denticulated within and extending above the spire; with four plaits anteriorly, and with smaller ones behind them, becoming obsolete. (Oldroyd.)

DISTRIBUTION. Alaska to Mazatlan, Mexico.

Cypraeolina pyriformis Carpenter, 1865

Journal de Conchyliologie, **13**: 148. Tryon, *Manual of Conchology,* **5**; Pl. 13, fig. 38.

V. t. parva "V. margaritulae" simili sed aurantiaco pallide tincta; antice angustiore, magio elongata; labio conspicus; labio postice parum sinuato, intus denticulis minus expressis ornato; plicis columellaribus normalibus, acutioribus. Long., .01; lat., .065 poll. (Carpenter.)

Shell small, pyriform, sometimes tinged with orange; aperture long and narrow, with the outer lip extending above the spire. Columella plates rather acute, four in number.

TYPE in United States National Museum. Type locality, San Diego, California.

RANGE. Peril Strait, Alaska, to Mazatlan, Mexico.

Described as *Volutella pyriformis.*

Family VOLUTIDAE

Genus **FULGORARIA** Schumacher, 1817

Shell oblong-fusiform; spire moderately elongated, terminated by a papillary summit with the apex lateral, instead of central and vertical as

usual in spiral shells; surface plicate longitudinally, crossed by engraved revolving lines; columellar plaits six or seven, or more; lip thickened within, its margin slightly crenulate. (Tryon, *Structural and Systematic Conchology.*)

TYPE. *Voluta rupestris* Gmelin.

DISTRIBUTION. Indian Ocean, Japan, Alaska, Australia, Eastern Polynesia, Atlantic Coasts of southern South America, to West Indies, southern Africa.

Scaphella (Voluta) arnheimi J. J. Rivers, 1891

Proceedings of the California Academy of Sciences, **3**, Part 1: 107.

Shell regularly formed, elongate-ovate; body whorl more than two-thirds as long as the spire; the spire an inch long, and made up of six whorls, the terminal nucleus being very small, pointed and oblique, which latter character places this species in the section *Scaphella* of Dall. Ground color obscure yellow, covered by a layer of chalk-like deposit. The body whorl has some coarse longitudinal elevations and depressions, remnants of former lip extensions, and there are two large patches of dark rusty red at a wide interval which do not appear to form an interrupted band. The aperture is elegantly formed and measures 1⅞ in. long by ⅞ in. wide; the inner lip is regularly outlined on the columella; columella plaits four, sharply oblique, the last one strongest, forming a prominent ridge parallel to the canal. The upper outlines of the mouth meet in a sharp angle, but the base has a well-defined bifurcation. The whole of the aperture and the edge of the outer lip are heavily coated with enamel of a yellowish tint, and rust stained. Size 3⅛ in. long and 1⅛ in. wide. Animal without operculum. (Rivers.)

TYPE in California Academy of Sciences. Type locality, dredged in Monterey Bay, California.

RANGE. Known only from type locality.

Subgenus BOREOMELON Dall, 1919

Fulgoraria stearnsii Dall, 1872

Plate 23, fig. 4

Proceedings of the California Academy of Sciences, **4**:270; Pl. 1, fig. 1.

Shell large, slender, spindle-shaped, moderately thick. Color livid purple, more or less obscured by an ashy-white outer layer, more conspicuous near the sutures and on the callosity of the inner lip. Exterior, smooth (but not polished) except for the strong lines of increase. Sutures appressed; siphonal fasciole strong; nucleus small, white mammillated.

Aperture more than half as long as the shell, white and livid purple, with a dash of brighter purple at the posterior notch and on the anterior portion of the callus. Edge white, callus reflected, thick and strong, with a chink behind the anterior portion. Canal twisted to the right, moderately deep. Long., 4.13; lat., 1.62; long. apert., 2.59 in. (Dall.)

TYPE in United States National Museum. Type locality, Pribilof Islands, Alaska.

RANGE. Pribilof, Aleutian, and Shumagin Islands, Alaska.

This was described at *Voluta* (*Scaphella*) *stearnsii*.

Genus **PHENACOPTYGMA** Dall, 1918

Shell fusiform, with transverse and axial sculpture, elongated canal and apparently simple pillar; the axis in the upper whorls with two well-marked plications.

This shell has the appearance of a *Pleurotomoid,* with the whorl constricted and appressed near the suture and a feeble incurvation of the margin of the lip at the constriction. By grinding away a portion of the apical whorls it was revealed that the axis is furnished with plications which extend to the beginning of the penultimate whorl. (Dall.)

TYPE. *Surculina cortezi* Dall, 1908.

DISTRIBUTION. California deep water to Gulf of Panama.

Phenacoptygma cortezi Dall, 1908

Plate 13, fig. 7

Bulletin, Museum of Comparative Zoölogy, **43**:292.

Shell slender, chestnut brown, fading to white or yellowish, fusiform, the spire shorter than the aperture, with more than five whorls; nucleus defective; somewhat constricted over the anal fasciole with an appressed suture, periphery moderately rounded; axial sculpture at the suture of small, little-raised folds, with wider interspaces, not surpassing the width of the fasciole; on the earlier whorls are small, feeble, narrow axial riblets extending to the suture (on the antepenultimate whorl, 14) with wider interspaces and almost vertical; these are crossed by very numerous flat, strap-like spirals with narrower channeled interspaces somewhat unequal in width and covering the whole shell; the entire surface is also sculptured with a multitude of fine spiral striae; outer lip thin, hardly arcuate; inner lip smooth, the surface erased; pillar anteriorly rapidly attenuated; anal sulcus shallow and inconspicuous; canal long and wide. Length of (decollate 4½ whorled) shell, 39–43; of last whorl, 29–34; of aperture, 24–27; max. diam., about 14 mm. (Dall.)

TYPE in United States National Museum, No. 110613. Type locality, U.S.S. "Albatross" Station 2919, off Cortez Bank in 984 fathoms.

RANGE. Off San Diego, California, to Cortez Banks.

This was described as *Daphnella* (*Surculina*) *cortezi.*

Family MITRIDAE

Genus **MITRA** Lamarck, 1799

Shell fusiform, thick; spire elevated, acute at the apex; aperture small, narrow, notched in front; columella obliquely plicate; outer lip thickened, smooth internally.

TYPE. *Mitra episcopalis* Lamarck.

DISTRIBUTION. Philippines, India, Red Sea, Mediterranean, West Africa, Greenland, Japan, Pacific West America. Fossil: Chalk, Cretaceous; Pleistocene.

The following have been placed in the genus *Strigatella* Swainson Subgenus ATRIMITRA Dall, 1918.

Mitra catalinae Dall, 1919

Proceedings of the United States National Museum, **56**:303.

Shell solid, black, fusiform, with about seven whorls exclusive of the (lost) nucleus; suture depressed, not deep, the whorls only moderately convex and polished; axial sculpture of extremely fine, hardly perceptible incremental lines; spiral sculpture of about four, fine, inconspicuous, minutely punctate, incised lines, only strong on the very early whorls, obsolete on the last whorl, with wide interspaces crossed by almost microscopic spiral striae; aperture narrow, the canal hardly differentiated, the enamel very dark, only the plaits whitish, the anterior plait feeble, only distinct in the completely adult shell, the other three conspicuous and strong. Height of shell, 29; of last whorl, 20; of aperture, 15; diameter, 11 mm. (Dall.)

TYPE in United States National Museum, No. 219643. Type locality, San Pedro, California.

RANGE. Crescent City to San Diego, California.

Mitra diegensis Dall, 1919

Proceedings of the United States National Museum, **56**:309.

Shell small, blackish-brown, slender, with a whitish nucleus of about three whorls and four subsequent whorls; the initial part of the nucleus very small and forming a blunt apex, the whole nucleus smooth and chang-

ing suddenly to the normal sculpture; the latter begins with four rounded, somewhat undulated, strong, spiral cords with narrower interspaces; on the next whorl the cords have flattened out and the much narrower interspaces are channeled; on the subsequent whorls the cords become still flatter and wider and the interspaces narrow grooves, occasionally punctate from the intersection of the incremental lines, otherwise hardly visible; on the last whorl the grooves are obsolete on the middle of the whorl, but there are half a dozen feeble threads on the base and canal; the suture is closely appressed; aperture narrow, simple, outer lip hardly thickened, body erased, pillar with two prominent and one obscure plait; canal not differentiated. Height of shell, 14; of last whorl, 11; of aperture, 8 mm. (Dall.)

TYPE in United States National Museum, No. 252998. Type locality, San Diego, California.

RANGE. Catalina Island to San Diego, California.

Mitra lowei Dall, 1903

Plate 16, fig. 4

Proceedings of the Biological Society of Washington, **16**:173. *Bulletin 112,* United States National Museum; Pl. 15, fig. 4.

Shell of a warm yellow-brown with a whitish apex; nucleus subtrochiform, smooth, solid, of about three conical whorls; subsequent whorls (in the type specimen) about four, rapidly increasing in diameter; those which immediately succeed the nucleus marginated in front of the suture by two or three fine spiral grooves, the interspaces of which stand up like threads, but these gradually become less pronounced and hardly noticeable on the fourth whorl where the sculpture becomes on the periphery fine, very inconspicuous, and widely separated grooves, only noticeable under a lens, but minutely punctate; they become somewhat stronger on the base and canal; aperture wide and semi-lunate; pillar with three nearly horizontal plaits; the canal very short and wide. Length of shell, 5.5; of last whorl, 4.5; diameter, 2.5 mm. (Dall.)

TYPE in United States National Museum, No. 109305. Type locality, off Catalina Island, California.

RANGE. Off Avalon, Catalina Island, California.

Mitra idae Melvill, 1893

Conchologist, **2**:140; Pl. 1, fig. 6.

M. testa elongato-cylindrica, ponderosa, nigra epidermide omnino contecta, spira obtusa fusiformi, anfractibus septem, transversim, regulariter

arctissime punctato-striatis minutis, ultimo anfractu in medio usque ad basin laeviore, apertura oblonga, labro exteriore recto, intus laevi, cinerascente, columella quadriplicata. Long., 2.25; lat., 75 in. (Melvill.)

This interesting species belongs to a section of the genus which has its headquarters on the western shores of North America and Mexico, and of which *M. lens* Wood may be taken as the type, all the species possessing a black or dark brown epidermis, and being more or less decussate or punctostriate, and it is not unlike the recently described *M. fultoni* E. A. Smith from the same locality. Differentiation, however, seems easy between them. *M. fultoni* exhibits a more distinct transverse punctuation, the pitting being both deeper and wider, the whorls are also ventricose, and the spire more acuminate, and attenuate in comparison. The outer lip, too, is more effuse thin in *M. idae*. With *M. caliginosa* Reeve, both species show more affinity, but here again, the transverse sulci are more regular, and scarcely punctate. I have seen nearly thirty specimens of this new form, and a good many also of *M. fultoni*, all keeping well to their individual characteristics. (Melvill.)

TYPE in B. J. R. LeB. Tomlin Collection, England. Type locality, Point Loma, California.

RANGE. Farallon Islands to Cortez Bank, California.

Mitra idae montereyensis Berry, 1920

Proceedings of the Malacological Society of London, **14**: 31; text figures, 1–4.

Shell of good size, robust, heavy, spindle-shaped, the maximum width contained in the length somewhat less than three times; whorls slightly convex on the spire, the latter tapering quite rapidly; sutures distinct but only weakly indented. Aperture ample, its extreme measurement nearly or quite one-half the entire length of the shell; the heavy outer lip suffers moderate thinning at the edge; columellar plaits strong and primarily three, but there is apt to be an incipient fourth one where the columella begins to draw into the canal in front, and a small adventitious plait now and then appears between two of the major ones. Canal short, weakly upturned. Practically the entire shell sculptured by numerous, rather fine, spiral threads, sometimes more or less obsolete on the peripheral region, and frequently so cut by the lines of growth as to result in an appearance of minute pitting, the spiral threads heaviest and coarsest in the region of the canal and the front of the shell generally. Lines of growth and incremental ridges numerous, varying from fine to coarse and irregular. Entire shell covered by a strong black or very dark brown periostracum. Interior of the shell white, or brownish-white, the columellar region (ex-

cept the plaits) and inside of the outer lip frequently deep brown. Length, 66.5; width, 23.5; length of body-whorl, 46.5; of aperture, 33.7 mm. (Berry.)

TYPE in Berry Collection, No. 298. Type locality, off Del Monte, Monterey, California, in 12 fathoms.

RANGE. Monterey to San Diego, California.

SECTION THALA H. & A. Adams, 1853

Mitra solitaria C. B. Adams, 1852

Panama Shells, 44. *Proceedings of the United States National Museum*, **13**; Pl. 15, fig. 14, 1890.

Shell rather slender, fusiform; of a deep blackish-brown, less deep in the aperture, and quite pale on the plaits; with very numerous small transverse ribs, which are obsolete anteriorly, and which are granulated by revolving striae, that are obsolete in the interspaces posteriorly, and are strongly developed anteriorly, with microscopic incremental striae; apex acute; whorls ten, moderately convex, slightly shouldered above, with moderately impressed suture; aperture long, with a rather short canal; labrum thick, with numerous sharp plaits inside, with a sinus near the posterior end; columella with four plaits. Length, .69; breadth, .23; length of aperture, .24 in. (C. B. Adams.)

TYPE in Amherst College. Type locality, Panama.

RANGE. Point Loma, California, to Panama.

Mitra orcutti Dall, 1920

Nautilus, **33**:103.

Shell small, white, mottled with yellow-brown, with five whorls of which the white smooth blunt nucleus comprises one; suture distinct; whorls moderately convex; spiral sculpture of (between the sutures four, on the last whorl, about a dozen) strong, rounded, close-set cords closely undulated behind the periphery by numerous low narrow axial riblets with about equal interspaces; the cords in front of the periphery are not undulated, but extend to the end of the canal; there are also very fine axial striae in the interspaces; aperture narrow, simple, the pillar with two plaits, the canal hardly differentiated. Height of shell, 5.6; of last whorl, 2.6; diameter, 2.7 mm. (Dall.)

TYPE in United States National Museum, No. 334567. Type locality, La Jolla, near San Diego, California.

RANGE. Known only from type locality.

Genus **VOLUTOMITRA** Gray, 1857

Shell ovate or fusiform, smooth, covered with an epidermis, whorls simple; columella with oblique plaits; outer lip thin, simple, arcuate. (Adams, Vol. 1.)

TYPE. *Volutomitra groenlandica* Gray.

RANGE. Alaska to San Diego.

Volutomitra alaskana Dall, 1902

Nautilus, **15**: 103. *Bulletin 112,* United States National Museum; Pl. 11, fig. 3.

Shell fusiform, with about six moderately convex whorls; suture distinct, surface wholly minutely spirally striated, covered with an olivaceous periostracum over a white or yellowish shell; aperture longer than half the total length, with a rather wide canal, callus pillar and body in the adult, and simple outer lip; the canal has a well-marked siphonal fasciole, and is slightly flexuous; plaits normally four, rarely three or five, strong and rather distinct; nucleus almost always eroded. Long., 17.5; long. of aperture, 26 mm. (Dall.)

TYPE in United States National Museum. Type locality, Pribilof Isands.

RANGE. Pribilof Islands to San Diego, California, in 822 fathoms.

Genus **MITROMORPHA** A. Adams, 1856

Shell small, elongately fusiform; whorls flattened, with revolving lirae, and sometimes longitudinally plicate. Aperture narrow; columella straight, slightly transversely lirate; lip acute, smooth within, scarcely sinuated posteriorly.

TYPE. *Mitromorpha gracilis* Carpenter.

DISTRIBUTION. California, Japan.

Mitromorpha filosa Carpenter, 1865

Annals and Magazine of Natural History, series 3, **15**:182. *Proceedings of the United States National Museum,* **15**; Pl. 19, fig. 1, 1892.

Testa parva, solidiore, atro-purpurea, subconiformi, antice et postice subequilater teriti; anfr. nucl. ii., albis, laevibus, apice mamillato; norm. iv., plantis, suturis haud distinctis; omnino aequaliter spiraliter lirulata lirulis acutioribus, in spira iv., anfr. ult. circ. xx., interstitiis majoribus; apertura lineata; labro parum inflexo, rotundato, postice vix sinuato, intus circ. xii.-dentato; labio inconspicuo; columella arcuatim truncata. Long., .26; long. spir., .1; lat., .12 poll. (Carpenter.)

Equally spirally lirate throughout, lip scarcely sinuous, with about a dozen minute internal denticles; purple-black, or chocolate color, without and within. Length, 5–6 mm. (Tryon, *Manual of Conchology.*)

Small, diamond-shaped, but rounded periphery, spirally threaded. (Carpenter.)

TYPE in British Museum. Type locality, Santa Barbara, California.

RANGE. Monterey to San Pedro, California.

Mitromorpha aspera Carpenter, 1865

Journal de Conchyliologie, **13.** Tryon, *Manual of Conchology,* **6**; Pl. 25, fig. 61.

Testa parva, tenui rufo-fusca, gracili, angusta, fusiformi, epidermide tenui induta; anfra. nucleosis 2 laevibus, vertice contorto; normalibus (t. adolescente) 4 elongatis, fenestratis, suturis distinctis; costulis radiantibus circiter 13 angustis, acutis, et costulis spiralibus, in spira 3, anfractu ultimo circiter 10, angustis, acutis, radiantes superantibus, eleganter decussata; intersectionibus subnodulosis, interstitiis quadratis; apertura elongata, antice effusa; labro postice vix sinuato. Long., .11; long. spir., .69; lat., .08 poll. (Carpenter.)

Elongated, with coarse fenestration. (Carpenter.)

Spirally lirate and longitudinally closely costulate, the intersections forming a roughly asperated surface; reddish-brown. (Tryon, *Manual of Conchology.*)

TYPE in British Museum. Type locality, Monterey, California.

RANGE. Monterey to San Pedro, California.

Mitromorpha gracilior Hemphill, 1884

Tryon, *Manual of Conchology,* **6**: 317; Pl. 25, fig. 62.

Decussation not so deep, so that the surface is smoother, the tuberculation smaller; sometimes the clathration of the body-whorl is only seen on the upper portion, the longitudinal costulae becoming obsolete below. Length, 4–5 mm. (Hemphill.)

TYPE in Hemphill Collection. Type locality, San Diego, California.

RANGE. Forrester Island, Alaska, to San Diego, California.

Mitromorpha gracilior intermedia Arnold, 1903

Paleontology of San Pedro, California, 223; Pl. 4, fig. 10.

Shell small, mitre-shaped; apex rounded; whorls six; slightly convex; whorls ornamented with about four equidistant, sharp, raised spiral lines, and numerous rounded, transverse ridges which are most prominent on angle of whorl; ridges obsolete, or nearly so, on body-whorl; suture

quite deeply impressed; aperture long, narrow, oblique; outer lip slightly arcuate anteriorly, smooth interiorly; inner lip smooth; columella spirally lined externally. Long., 9.5; lat., 3.9; body-whorl, 6.5; aperture, 4.5 mm. (Arnold.)

TYPE in United States National Museum. Type locality, Lower San Pedro, series at Deadman Island, San Pedro.

RANGE. Living, Santa Rosa Island, California. Fossil: Pliocene of San Pedro, and Pleistocene of Santa Barbara.

Family FASCIOLARIIDAE

Genus **PTYCHATRACTUS** Stimpson, 1871

Shell fusiform, spirally striated; aperture with a moderate canal; columella plicated as in *Fasciolaria.* (Tryon, *Manual of Conchology.*)

The shell of this genus unites the form of a *Sipho* with the folds of a *Fasciolaria;* its small size, color, and northern habitat will distinguish it from the latter, even without taking into account the very diverse dentation; yet without the latter difference it would scarcely have been advisable to have separated the single species upon which the genus was founded from *Fasciolaria.* (Tryon, *Structural and Systematic Conchology.*)

TYPE. *P. ligatus* Mighels and Adams.

DISTRIBUTION. Boreal Atlantic and Pacific.

Ptychatractus occidentalis Stearns, 1871

Plate 7, fig. 1

Conchological Memoranda, 7:1. *Bulletin 112,* United States National Museum; Pl. 6, fig. 3.

Shell elongated, fusiform, rather slender, whitish, traversed by narrow, revolving, brownish threads and much wider intervening spaces; suture distinct, spire tapering; aperture oblong-oval, about half the length of the shell; within white, polished; canal short, nearly straight; columella obliquely plicated. Length about ¾ in. (Stearns.)

TYPE in United States National Museum. Type locality, near Attou Island, Aleutian group, Bering Sea.

RANGE. Bering Island to Shumagin Islands, Alaska.

Ptychatractus californicus Dall, 1903

Bulletin, Museum of Comparative Zoölogy, **48**:299.

Shell small, fusiform, white, with a pale straw-colored periostracum and about five whorls; suture distinct, not appressed, whorls turgidly

rounded; axial sculpture of (on the last whorl, about 15) low, rounded, nearly vertical ribs, with about equal interspaces, which are strongest at the periphery and gradually become weaker in each direction, and obsolete on the base; the periostracum is vertically wrinkled, but the incremental lines are not conspicuous; spiral sculpture of (on the penultimate whorl, six or seven; on the last whorl, about twenty) flattish spiral threads with subequal or slightly narrower channeled interspaces, this sculpture extending to the tip of the canal; these threads override the ribs but without turgidity at the intersections; aperture elongate, ovate; outer lip simple, sharp, not reflected; inner lip not callous, pillar short, obliquely attenuated; canal short, recurved, narrow; on the pillar one feeble plait is visible at the aperture, farther back there are two, and in the spire three with faint indications of a possible fourth plait, oblique and rather close together near the anterior edge of the pillar. Length of shell, 11; of last whorl, 8.5; of aperture, 5.5; max. diam., 5.5 mm. (Dall.)

TYPE in United States National Museum, No. 193650. Type locality, off San Diego, California, in 822 fathoms.

RANGE. Monterey Bay to San Diego, California.

Genus **FUSINUS** Rafinesque, 1815

Shell fusiform; spire long, acuminate, many-whorled; aperture oval, usually striate within; outer lip simple; columella smooth; no umbilicus; canal long and straight. Yellowish-brown or light horn-color, sometimes with red-brown strigae or spots; never banded. Operculum ovate, acute, with apical nucleus. (Tryon, *Structural and Systematic Conchology.*)

This is Lamarck's description of Genus *Fusus*.

TYPE. *Fusus colus* Linneaus.

DISTRIBUTION. Tropical and subtropical, world-wide. Cretaceous-Pleistocene.

Fusinus traski Dall, 1915

Plate 9, fig. 4

Proceedings of the California Academy of Sciences, 1:43. Arnold, *Paleontology of San Pedro, California;* Pl. 4, fig. 7.

New name for *F. rugosus* Trask, 1855.

Shell fusiform, somewhat thin, turreted; spire acute; eight convex whorls; two first without folds; nine distant folds on the last whorl becoming obsolete on a line parallel with the posterior edge of the aperture; two last whorls traversed by small longitudinal wrinkles; about fourteen elevated, somewhat squared, lines on the last whorl, with intermediate

smaller lines between, which are continuous to the base of the shell. Aperture semicircular; canal oblique and somewhat elongated; from the posterior edge of the aperture to the anterior end of the canal, is little more than half the length of the shell; outer lip thin; columella smooth. Length, 1.4; breadth, .6 in. (Trask.)

TYPE in California Academy of Sciences. Type locality, San Pedro.

RANGE. San Pedro to San Diego, California. Fossil: Pleistocene, Santa Barbara and San Pedro.

This is Trask's description of his *Fusus rugosus*.

Described from a fossil.

SECTION HEILPRINIA Grabau, 1904

Fusinus barbarensis Trask, 1855

Proceedings of the California Academy of Sciences, 1: 41. Arnold, *Paleontology of San Pedro, California;* Pl. 4, fig. 15.

Shell fusiform; rather thin; about seven convex whorls; turreted; the last whorls have about twelve rounded folds becoming obsolete near the middle of the last whorl; eight or nine wavy transverse threads traverse the lower whorl, becoming less defined from the middle forward; folds interrupted at the sutures; apex subacute. Aperture semicircular; canal slightly oblique; external lip rather sharp and thin; indistinct striae within, columella smooth. Length, .9; breadth, .4 in. (Trask.)

TYPE in California Academy of Sciences. Type locality, Santa Barbara, California.

RANGE. Heceta Bank, Oregon, to San Diego, California. Fossil: Pleistocene, Santa Barbara, San Pedro. Pliocene, San Pedro.

Described from a fossil.

Fusinus robustus Trask, 1856

See Part II, Plate 3, fig. 6

Nautilus, **29**: 55.

Shell fusiform, turreted thick; about seven convex whorls; eight varicosed, distinct folds on the last whorls, which are interrupted at the sutures; about five revolving lines on the upper whorls, and twelve on the last; folds become obsolete a little anterior to the middle of the body whorl; greatest breadth across the posterior portion of the aperture. Aperture obovate; outer lip thick; canal straight; distance from the posterior edge of the aperture to the end of the canal, equal to half the length of the

shell; apex of the spire bluntly rounded. Length, 1.2; breadth, .5 in. (Trask.)

TYPE in ? Type locality, San Pedro, California.

RANGE. Banks Island, British Columbia, to Pequena Bay, Lower California. Fossil: Pleistocene, Santa Barbara, San Pedro, California.

Described from a fossil.

Fusinus kobelti Dall, 1877

Proceedings of the California Academy of Sciences, **7**:54. *Proceedings of the United States National Museum,* **14**:177; Pl. 6, fig. 4.

Shell elegantly and regularly fusiform, of seven or eight whorls, sculptured with revolving lines and transverse costae. In young specimens the whorls are somewhat rounded, in the adult elongated. Epidermis in perfect specimens dark ashy or greenish olivaceous, rising in crowded lamellae and obscuring the coloration. This varies, however, with age and habitat. Apex acute, the second and third whorls hardly larger than the embryo. Color whitish, the alternate revolving ridges of a dark brown, which occasionally extends to all the ridges. These ridges do not lose their color in passing over the costae, except where worn off by rolling on the beach. Except on the earlier whorls the ridges do not show any tendency to enlarge in passing over the costae. On the posterior edge of the whorls the shell is appressed on the suture, and the ridges here are inconspicuous in most specimens, compared with those on the body of the whorl. These ridges, moreover, bear the character of threads, the interspaces not being channeled, as in *F. harfordi* and *luteopictus*. In the most perfect specimens, on the last whorl there are twenty-two brown ridges and as many more intercalary, of the same color as the shell. In melanitic specimens all may be tinged brown. On the antepenultimate whorl between the sutures there are about six main ridges and eight intercalary. The costae are rounded and prominent only on the earlier whorls, but they remain on the last whorl in a flattened condition, but extend well over the periphery, and are not obsolescent as in the last species. The interior of the aperture is white. Before the lips are thickened the brown lines show through, and the prominent white threads of the throat are distant from the outer edge. In this stage there is no siphonal fasciole. Later both lips may be strongly thickened; the threads (ten or fifteen in number) nearly reach the edge; a labial callus and fasciole are formed. In adults there are about twelve costae on the last and ten on the sixth whorl. Length, 2 to 3 in. (Dall.)

The features of a young living specimen from Monterey are obscured by the shaggy epidermis, of which beach specimens show no trace whatever. In much thickened specimens there is a lump on the whorl at the posterior angle of the aperture. It is perfectly distinct from the other Californian species and from any I find figured in the monographs. (Dall.)

TYPE in United States National Museum. Type locality, Monterey, California.

RANGE. Monterey to San Diego, California.

SECTION FUSINUS s.s.

Fusinus luteopictus Dall, 1877

Proceedings of the California Academy of Sciences, **7**:3. *Proceedings of the United States National Museum,* **15**; Pl. 20, fig. 4, 1892.

Shell small, fusiform; whorls five, convex, crossed by nine rounded ridges which reach their maximum development on the middle of the whorl; surface ornamented with three or four prominent spiral lines, with finer ones sometimes intercalated; suture appressed; aperture subovate; outer lip not thickened, with internal spiral lines; inner lip incrusted; columella short; canal very short, narrow. Long., 19; lat., 10; body-whorl, 13.5; aperture including canal, 10; canal, 3 mm. (Arnold.)

TYPE in United States National Museum. Type locality, Monterey, California.

RANGE. Monterey, California, to Gulf of California. Fossil: Pleistocene, San Pedro, California.

Fusinus diminutus Dall, 1915

Plate 8, fig. 1

Nautilus, **29**:56.

A little brownish species has been received from San Pedro Bay from several collectors which seems to be undescribed. It has five whorls without the nucleus, four or five strong spiral threads between the sutures on the spire and 13–15 on the last whorl, with a few minute and irregular intercalary threads; the interspaces are crossed by minute axial ribs, most distinct near the periphery. The shell is about 11 mm. long by 5.5 mm. wide, and 5 mm. of the length is included in the spire. (Dall.)

TYPE in United States National Museum. Type locality, San Pedro, California.

RANGE. Known only from the type locality.

SECTION HARFORDIA Dall, 1920

Fusinus harfordii Stearns, 1871

Conchological Memoranda, Part 7, p. 1. *Proceedings of the United States National Museum,* **14**; Pl. 6, fig. 6, 1891.

Shell solid, elongate, regularly fusiform; spire elevated, whorls six or seven moderately convex, slightly flattened (in outline) above, with a groove or channel following the suture; color, chocolate-brown; surface marked by numerous narrow revolving costae, which alternate in prominence on the body whorl, and longitudinally by fine incremental striae, and on the upper whorls by obtusely rounded ribs of more or less prominence; aperture ovate, about one-half the length of the shell, polished white and finely ribbed within; (the outer lip in perfect specimens is probably finely crenulated); canal short, nearly straight. Long., 2.1; lat., .94 in. (Stearns.)

TYPE in United States National Museum. Type locality, coast of Mendocino County, near Big Spanish Flat, California.

RANGE. Known only from the type locality.

SECTION ROPERIA Dall, 1898

Fusinus roperi Dall, 1898

Plate 28, fig. 3

Nautilus, **12**:4. *Proceedings of the United States National Museum,* **14**; Pl. 6, fig. 6, 1891.

Shell small, rather short and wide, with a short subacute spire and about six whorls; color ferruginous brown, faintly spirally zoned and lighter on the siphonal fasciole, pillar and throat whitish, outer lip between the white of the throat and the margin showing narrow spiral brown lines on a yellowish ground, whorls with a tendency to a white, narrow peripheral line most evident on the summits of the ribs; whorls excavated behind, somewhat rounded before the periphery, the margin at the suture strongly appressed with the whorl in front of it somewhat constricted; suture distinct, hardly undulated, the spiral thread in front of it slightly minutely imbricated; axially directed sculpture of finely wrinkled silky incremental lines and (on the last whorl) nine rounded ribs with rather wider interspaces, the ribs are obsolete near the suture, on the early whorls, and on the base; spiral sculpture of numerous flat strap-like threads with the interspaces much narrower and sharply reticulated by the incremental sculpture which rises in the interspaces nearly to the

level of the tops of the threads; the nucleus (lost) is small, the first two or three whorls are more coarsely reticulate than the later ones; aperture elongated and insensibly passing into a rather wide and short canal; siphonal fasciole rather marked, though the siphon is not recurved; pillar smooth, nearly straight with little callus; the body with no subsutural callus; the outer lip slightly flaring, hardly thickened. Long. of shell, 26; of aperture, 15.5; lat., 13 mm. (Dall.)

TYPE in United States National Museum. Type locality, Terminal Island, San Pedro, California.

RANGE. Known only from type locality.

Subgenus APTYXIS Troschel, 1868

Fusinus taylorianus Reeve, 1848

Conchologia Iconica, Fusus, fig. 85.

Shell pyramidially fusiform, canal short, whorls swollen and somewhat angled in the middle, longitudinally strongly ribbed, spirally striated, striae raised, more prominent upon the ribs; yellowish-brown, lower part of the whorls conspicuously blotched with chestnut-brown, ribs whitish, interstices obscurely dotted with brown. (Reeve.)

TYPE in Museum Taylor, British Museum. Type locality, not known.

RANGE. San Pedro, California, to Cape San Lucas, to Panama.

Genus **METZGERIA** Norman, 1879

Shell elongate fusiform, longitudinally obtusely plicate; spire produced; canal exserted; columella obscurely plicate. Operculum irregularly ovate; apex obtuse; nucleus inconspicuous. (Tryon, *Structural and Systematic Conchology.*)

TYPE. *Meyeria alba* Jeffreys.

DISTRIBUTION. Faroë Island, North Sea, Norway, California.

Metzgeria californica Dall, 1903

Plate 16, fig. 7; Plate 8, fig. 4

Nautilus, 17:51.

Shell small, translucent white, with a pale straw-colored, dull, wrinkled and rather conspicuous periostracum; nucleus small, smooth, white, obliquely inclined, of nearly two whorls; there are four or five rounded subsequent whorls separated by a deep, not channeled, suture; sculpture of about nine rather prominent, rounded axial ribs extending from suture to suture and on the last whorl to the base, separated by wider interspaces and crossed by numerous subequal spiral threads, covering the whole

shell, their wider interspaces striated by the incremental lines. Aperture about half as long as the shell, the outer lip sharp, the throat smooth and white; the pillar white, not callous, with three distinct, oblique plaits beside the slightly raised margin of the canal, these are only visible from the side of the aperture; anteriorly the pillar is tortuous, slightly recurved, open and rather wide. Length of shell, 14; of the aperture, 7; width of shell, 6 mm. (Dall.)

TYPE in United States National Museum. Type locality, off Avalon, Catalina Island, California.

RANGE. Santa Barbara Channel, as far as Catalina Island.

Family CHRYSODOMIDAE

Genus **KELLETTIA** Bayle, 1884

Shell large, fusiform, heavy. Whorls strongly spirally striated, nine or ten in number, nodulous along the median angulation. Outer lip thickened, showing the inner spiral ribs; inner lip smooth with callus. Spire high, almost fusiform. Aperture half the length of shell; canal moderately long, recurved; umbilicus open. (I. Oldroyd.)

TYPE. *Kellettia kellettii* Forbes.

DISTRIBUTION. California, Lower California, and Japan.

Kellettia kellettii Forbes, 1850

Proceedings, Zoölogical Society of London, 1850, p. 274; Pl. 9, fig. 10.

F. testa crassa, fusiformi, pyramidata, anfractibus 9, spiraliter striatis, angulatis, noduloso-costatis in anfractibus ominbus 8, prope suturam obsoletis excavatis appressisque; anfractu ultimo ⅔ testae occupante; apertura elongato-pyriformi, superne angulata; inferne canali oblique plus ⅓ aperture aequante; labro columellari reflexo, incrassato, labro externo, attenuato, subdenticulato; cauda incrassata, contorta, reflexa; colore sordidae albido, ore albo. Long., 3½; lat. max. anfr. ult., 1.2; long. apert., 2¾; long. caud., .9 unc. (Forbes.)

It is distinct from any known *Fusus*. In general aspect it closely resembles a *Fasciolaria,* but is greatly larger and has no plaits on the pillar lip. The striae which wind round the whorls are grouped in twos and threes. They become very strongly marked and assume the character of sulcations on the caudal portion of the body-whorl. The ribs are mainly developed a little above the centre on the angulated portion of the body-whorl and on the lower halves of the upper whorls, so prominently as to appear like large tubercles. (Forbes.)

TYPE in British Museum. Type locality, California coast.

RANGE. Santa Barbara, California, to San Quentin Bay, Lower California, also Japan. Fossil: Pleistocene, San Pedro to San Diego, California.

Described as *Fusus kellettii.*

Genus **MACRON** H. and A. Adams, 1853

Inner lip with the callus defined; columella obliquely wrinkled; spire elevated, suture channeled. (H. and A. Adams.)

TYPE. *Macron kellettii* A. Adams.

DISTRIBUTION. California, Lower California, to West Patagonia.

Macron aethiops kellettii A. Adams, 1853

Proceedings, Zoölogical Society of London, 185. Tryon, *Manual of Conchology,* 3: 214; Pl. 82, fig. 477.

P. testa ovata, solida, subperforata, epidermide fusco villoso tecta; spira prominula, anfractibus rotundatis, sutura canaliculata, anfractu ultimo transversim sulcato, sulcis postice evanidis, antice valde distinctis, unica profunda, in dente sulcato, ad labrum, terminata; apertura ovali, columella postice callosa, antice flexuosa, producta; labro postice inflexo, antice sinuato-dentato. (A. Adams.)

Epidermis blackish or dark brown, under which the shell is white. Whorls partially or entirely encircled with low, broad, rounded ribs, sometimes only apparent on the lower part of the body whorl, sometimes obsolete. Length, 1.75–3 in. (Tryon, *Manual of Conchology.*)

TYPE in British Museum? Type locality, not known.

RANGE. Catalina Island to Lower California. Fossil: Pleistocene, San Pedro to San Joaquin Bay, Orange County, California, and Lower California. Pliocene, Ventura County, California.

Described as *Pseudoliva.*

Macron lividus A. Adams, 1854

Proceedings, Zoölogical Society of London, 136. Tryon, *Manual of Conchology,* 3: 214; Pl. 82, fig. 478.

P. testa ovali, cinerascente, livida, spira obtusa, apice erosa, anfractibus 3–4 convexiusculia, transversim crebre striatis, anfractu ultimo antice oblique sulcato, sulco unico valde impresso; apertura ovali, columella alba postice callo spirali instructa, antice oblique plicata, canali brevi, aperta, labro margine antice unidentato, intus lirato. (A. Adams.)

Epidermis dark brown, whitish or livid beneath; surface smooth except several incised striae near the base. Length, 20 mm. (Tryon, *Manual of Conchology.*)

TYPE in Museum Cuming.

RANGE. Farrallon Islands, California, to San Bartolome Bay, Lower California. Fossil: Pliocene, San Pedro, California.

Mr. Cuming gives the type locality as west coast of Africa, which must be a mistake.

This was described as *Pseudoliva.*

Genus **PYRULOFUSUS** Mörch, 1869

Shell large, relatively thin, with a very short spire and large body whorl, usually sinistral but with rare dextral individuals; nucleus very large, smooth, flat-topped, infolded with an apical dimple, subsequently spirally sculptured, with obscure axial folds; periostracum thin, dehiscent; aperture ample, the outer lip expanded and thickened, the body and pillar enameled, often brightly colored; the canal very short, shallow and wide, hardly incurved, and with no evident siphonal fasciole; operculum much smaller than the aperture, rounded-quadrate with apical nucleus: radula, chrysodomoid but rather irregular, the rhachidian tooth in the typical species tricuspid; the laterals with two large terminal cups, the median cusp of the central tooth variable. (Dall.)

TYPE. *Fusus deformis* Reeve.

DISTRIBUTION. North Pacific, Arctic, North Atlantic.

Pyrulofusus deformis Reeve, 1847

Conchologia Iconica, Fusus, fig. 45.

Shell ovate, rather thin, ventricose, sinistral, spire papillary, depressed; whorls transversely very finely striated, obliquely tubercularly swollen beneath the sutures, aperture very large. (Reeve.)

Length, 3 in. (Tryon, *Manual of Conchology.*)

TYPE in Musum Cuming. Type locality, Spitzbergen.

RANGE. Arctic Ocean and south to the Shumagin Islands, Alaska; circumboreal.

Pyrulofusus harpa Mörch, 1858

Plate 29

Novitates Conchologicae Mollusca Marina, **5**; Pl. 1, figs. 3, 4.

Testa sinistrosa ovata, sordide caeruleoque albidanet rufescente, in apice obtusa; anfractibus quinis sutura profunda divisis, transversim sulcatis,

ad longitudinem nodoso-costalis, costis magna haud regularibus subobliquis; apertura longa, paene lunata; columella subrecta callosa; faucibus rufescentibus. Cochlea insignis sinistrosa cassa et ponderosa, 84 mm. longa. et 50 mm. lata est; anfractibus eius ultimus paene $\frac{4}{5}$ testae occupat (si mensuram a tergo feceris), ita ut apertura perlonga appareat. Anfractus convexi sulcis latis costisque elevatis transversis instructi sunt; in ultimo costae circa viginti numerantur. Apex obtusus papillae haud dissimilis laevis est et spadiceus, anfractus cetri ad longitudinem nodosoplicati sunt. Color testae sordide caeruleoque albidus et rufescens, praesertim iis quoque in locis, ubi corium detritum est. Striae incrementi aperturam versis tantummodo expressimae sunt. (Mörch.)

Sinistral shell, ovate, dully bluish-white and rufescent on the obtuse apex; five whorls divided by a deep suture, transversely sulcate, nodose-costate longitudinally, with regular suboblique costae; aperture long, somewhat turrate; columella nearly straight callus; inside rufescent. A remarkable shell, sinistral, thick and ponderous, its last whorl occupies a part of the rear, so that the very long aperture may show. The whorls are ornamented with broad furrows and high transverse ribs; on the last whorl are counted about 20 ribs. The obtuse nipple-like apex is smooth and brownish; the other whorls are nodose-plicate longitudinally; color of the shell dully bluish-whitish and rufescent, especially on these places where the covering has been destroyed. Some of the growth most strongly emphasized toward the aperture. (Translation.)

TYPE in Zoölogy Museum, Copenhagen. Type locality, Sitka, Alaska.

RANGE. Pribilof Islands to Aleutian and eastward to Kodiak, Alaska.

Pyrulofusus harpa dexius Dall, 1907

Miscellaneous Collections, Smithsonian Institution, **50**:164.

Shell resembling the ordinary type, but with stronger and closer spirals and dextrally wound. Long. of shell, 130 mm. (Dall.)

TYPE in United States National Museum, No. 110484. Type locality, Station 4779, Petrel Bank, Bering Sea.

RANGE. Known only from type locality.

Genus **VOLUTOPSIUS** Mörch, 1857

Shell large, frequently rude or irregular, with the last whorl largest, covered with a thin, inconspicuous, more or less dehiscent periostracum; spire short, blunt, beginning with a relatively large, smooth, bulbous nucleus; sculpture variable, smooth, spirally striate, or with indistinct

wave-like, axially directed prominences or even with feeble axial ribs; the aperture ample, the canal short, wide, hardly differentiated. Operculum short-ovate or rounded-quadrate, the nucleus at the right anterior corner. (Dall.)

TYPE. *Fusus largillierti* Petit.

DISTRIBUTION. Boreal and Arctic; especially numerous in the Bering Sea region.

Volutopsius fragilis Dall, 1891

Plate 10, fig. 4

Proceedings of the United States National Museum, 14:187; 17; Pl. 28, fig. 4, 1894.

Shell thin, inflated, five-whorled, pinkish, with a thin dehiscent epidermis, fine wavy spiral striae, strongly recurved canal, and widely reflected outer lip. Spire very short, whorls irregularly ribbed near the shoulder or sometimes having imbrications like a *Trophon* in place of ribs; axis nearly pervious. Length of aperture, 70; of shell, 100; breadth, 63 mm. (Dall.)

TYPE in United States National Museum. Type locality, Station 3252, off Unimak Island, Bering Sea, in 15–121 fathoms.

RANGE. Known only from type locality.

Volutopsius melonis Dall, 1891

Plate 10, figs. 2, 3

Proceedings of the United States National Museum, 14:187; 17; Pl. 28, figs. 2, 3, 1894.

Shell large, very thin, inflated, pinkish or yellow and white, last whorl much the largest, the aperture but little expanded, general form ovate, with numerous short obscure waves near the shoulder; surface faintly striated, with obscure spiral bands on some portions. Length, 137; breadth, 75 mm. (Dall.)

TYPE in United States National Museum. Type locality, Station 3227, off the coast of Unalaska Island, Bering Sea.

RANGE. Known only from type locality.

Volutopsius beringi Middendorff, 1846

Beitrage zu einer Malacologia Rossica, 2:147; Pl. 3, figs. 5, 6.

Testa flaviccenta, strato externo calcareo, solida, crassa ovato-fusiformi anfractibus parum convexis, transversim plicatis, plicis in quoque anfractu 9 ad 11; plicarum interstitiis canaliculis obsoletioribus

4 ad 6 transversis exaratis; columella recta longiuscula; labio modice-calloso; labro simplici; apertura albescente, varicosa, ad plicas externas late-caniculata canali recto. Long., 116; lat., 60; anfr. ult., 69; lat. aperture, 35; col. ext. long., 51 mm. (Middendorff.)

Shell yellowish, with external calcareous layer, solid, thick, ovate-fusiform, with whorls little convex, transversely plicate, with 9 to 11 plications in each whorl; with 4 to 6 more obsolete interstitial; canals of the plications transversely inter-arched; with straight and longer columella; with lip moderately callous; lip simple; aperture whitish, varicose, broadly canaliculate to the external plications; canal straight. (Translation.)

TYPE in Academy of St. Petersburg. Type locality, Bering Sea.

RANGE. Arctic Ocean to Pribilof Islands.

Volutopsius beringi kobelti Dall, 1902

Plate 23, fig. 2

Proceedings of the United States National Museum, **24**:528; Pl. 35, fig. 2.

Shell with the usual basal striation, but above the base the spirals when present are coarse, obsolete, sparse, and irregular. *V. beringi* is absolutely smooth, except at the canal. The axial waves (they can hardly be called ribs) of *V. kobelti* are feeble and irregular, the shell is relatively thin and light compared with *V. beringi,* and has much coarser incremental lines, more acute and rather higher spire, and a less effuse aperture. (Dall.)

TYPE in United States National Museum, No. 108990. Type locality, Pribilof Islands, Bering Sea.

RANGE. North end of Nunivak Island, Bering Sea, to Pribilof Islands.

Volutopsius stefanssoni Dall, 1919

Plate 16, fig. 9; Plate 19, fig. 2

Scientific Results of the Canadian Arctic Expedition, **8**:22*a*; Pl. 1.

Shell large, heavy, rude, pinkish-brown with a rosy protoconch and five rapidly enlarging whorls; nucleus swollen, large, irregular, of about two whorls blunt at the apex; suture distinct, not channeled; whorls inflated, with a high rounded shoulder and five or six obscure swellings at the shoulder which do not become definite ribs; there is no spiral sculpture, but the lines of growth are rude and occasionally lamellose, especially toward the aperture in senile individuals; canal short wide, slightly re-

curved; aperture wide, the outer lip thickened but hardly reflected, throat whitish; body in the mature shell with a layer of whitish enamel which extends to the end of the pillar, which is arcuate, shorter than the aperture, and obliquely truncate in front. Height of shell, 114; max. diam., 65; height of last whorl, 87; of aperture, 75 mm. (Dall.)

TYPE in Ottawa. Type locality, Station 24, Point Barrow, Alaska.

RANGE. Arctic Ocean to Pribilof Islands, Bering Sea.

Volutopsius rotundus Dall, 1919

Plate 22, fig. 4

Proceedings of the United States National Museum, **56**:310.

Shell large, slender, rather thin, with a distinct, almost constricted suture and more than five rounded whorls (the extreme apex defective); white or pinkish with a thin, dehiscent, pale straw-colored periostracum; axial sculpture on the apical whorls of a few, irregular, low plications, mostly with narrower interspaces; on the rest of the shell only irregular incremental rugosities; spiral sculpture on the last whorl behind the base of a half-dozen obscure low cords with wider interspaces; on the base these cords number about 15, becoming more regular and close anteriorly; the canal is still more finely and closely threaded; aperture elongate, outer lip thin, body and pillar erased; canal short and wide. Height of four whorls, 105; of last whorl, 75; diameter, 40 mm. (Dall.)

TYPE in United States National Museum, No. 206350. Type locality, Kodiak Island, Alaska.

RANGE. Kodiak Island to Cook's Inlet, Alaska.

Volutopsius middendorffii Dall, 1891

Plate 10, fig. 1

Proceedings of the United States National Museum, **14**:186; **17**; Pl. 28, fig. 1, 1894.

Closely resembling *Strombella norvegica,* but sharply, finely, spirally incised all over, and when adult, with a strong, red, yellow or brown reflected lip. Probably *Tritonium norvegicum* Midd. (not Chemnitz). The sculpture is of sharp, fine grooves, not the obsolete spiral striae occasionaly seen on *S. norvegica.* Length, 110; breadth, 60 mm. (Dall.)

TYPE in United States National Museum. Type locality, Stations 3216 and 3253, off Unimak Pass, Alaska, in 36–61 fathoms.

RANGE. Known only from type locality.

This was described as *Strombella middendorffii.*

Volutopsius simplex Dall, 1907

Plate 16, fig. 10

Miscellaneous Collections, Smithsonian Institution, **50**:164.

Shell large, thin, pale brown, with five or six whorls somewhat constricted at the suture; nucleus large, mammillate, of about two whorls; subsequent whorls rather convex, smooth, or marked only by irregularities of growth or incremental lines; profile fusiform, the last whorl largest but not expanded; outer lip arcuate, sharp, slightly thickened but not reflected; body without callus; pillar concave, curved to the right, twisted, short, with hardly a trace of a siphonal fasciole; canal short, wide, not recurved. Long. of shell, 101; of last whorl, 80; of aperture, 57; max. diam., 45 mm. (Dall.)

TYPE in United States National Museum, No. 110475. Type locality, Station 4792 off Bering Island.

RANGE. Off Bering Island, Bering Sea, in 72 fathoms.

Volutopsius attenuatus Dall, 1874

Plate 4, fig. 3

Proceedings of the California Academy of Sciences, **5**:253. *Proceedings of the United States National Museum,* **24**; Pl. 36, fig. 3.

Shell solid, pinkish-white, much attenuated before and behind; spire one-quarter shorter than the aperture. Whorls six, apex mammillated. Posterior surface of the whorls flattened toward the suture, where they are somewhat wrinkled and appressed. Surface of the whorls completely covered with fine even spiral lines. Aperture long and narrow, a thickened callus on the inner lip, and the outer lip slightly reflected. Canal long, nearly straight, rather narrow. Long. of shell, 2.33; of aperture, 1.4; lat. of shell, 1 in. (Dall.)

TYPE in United States National Museum. Type locality, Cook's Inlet, Alaska.

RANGE. Arctic Ocean to Pribilof Islands, and Bristol Bay.

Volutopsius trophonius Dall, 1902

Proceedings of the United States National Museum, **24**: 527. *Bulletin 112,* United States National Museum; Pl. 8, fig. 11.

Shell with a short spire and robust body whorl; pale reddish-brown and white, with five or more whorls; nucleus of nearly two whorls, smooth, inflated, blunt above (diam., 6.5 mm.); a subsequent whorl irregular, finely spirally striate; after which the whorls develop (on the fifth about 22) high, thin, sharp, flexuous varices or lamellae extending entirely over

the whorl, somewhat irregular, and more or less spirally, finely striated; aperture ovate, canal short, curved, and very wide; pillar thin, concave, short, twisted; outer lip expanded, thin. Long. of shell, 6; of aperture and canal, 40; max. diam., 37 mm. (Dall.)

TYPE in United States National Museum, No. 109167. Type locality, off Pribilof Islands.

RANGE. Bering Sea to Pribilof Islands.

Volutopsius filosus Dall, 1919

Plate 17, fig. 2

Proceedings of the United States National Museum, 56:310. *Bulletin 112,* United States National Museum; Pl. 10, fig. 1.

Shell small, solid fusiform, of a livid flesh color with grayish-white outer coat and dehiscent olivaceous periostracum and about six whorls, the nucleus decorticated; suture distinct, rather deep; sculpture of uniform, fine, flattish threads, close-set, about two to a millimeter, covering the whole surface, with axial sculpture of fine, inconspicuous, incremental lines; whorls evenly rounded but not reflected; aperture elongate, the outer lip thickened and slightly reflected; the body and rather straight pillar thickly enameled; canal short and wide, slightly recurved, with a feeble fasciole; the operculum is brown, narrow, parallel-sided, with the nucleus at the right hand corner. Height of shell, 64; of last whorl, 52; diameter, 30 mm. (Dall.)

TYPE in United States National Museum, No. 223055. Type locality, United States Fish Commission Station 3283 off Khudubine Islands, Bering Sea.

RANGE. Pribilof to Aleutian Islands, Bering Sea.

Volutopsius callorhinus Dall, 1877

Proceedings of the California Academy of Sciences, 7:7. *Scientific Results of the Exploration of Alaska;* Pl. 1, fig. 3, 1879.

Shell white, solid, smooth, with faint traces of revolving striae, spire acute; embryonal whorls very minute, not mammillate; suture distinct, not channeled. Canal very short, wide, straight; aperture rounded, outer lip thickened, strongly waved behind; posterior angle not acute. Whorls seven, evenly tapering, not inflated. Length, 2; width, 9; aperture and canal, .92; long. spire, 1.08; width of aperture, .4 in. (Dall.)

TYPE in United States National Museum. Type locality, St. Paul Island, Bering Sea.

RANGE. Pribilof Islands, Bering Sea.

Volutopsius callorhina stejnegeri Dall, 1884

Proceedings of the United States National Museum, 7:346; Pl. 2, fig. 5.

It is slightly more elongated than the original specimen from the Callorhinus rookery at St. Paul Island, and presents other characters, which, if constant, would separate it perhaps specifically. The shell has five and a half whorls (the nucleus is gone) and presents indications of about nine, obscure, irregular, transverse ribs; the surface sculpture where preserved is fine and sharp, like that of *Chrysodomus kroyeri;* the epidermis pale brown, extremely thin, and dehiscent. The shell has a grayish-green tint, perhaps partly from a confervoid growth, the aperture as in my figure of *Strombella callorhina,* the margin inside yellowish, the throat livid white, the columellar side with a touch of dull purple. Long. of shell, 60; of last whorl, 40; of aperture, 28.5 mm. (Dall.)

Type in United States National Museum, No. 40935. Type locality, St. Paul Island, Pribilof Islands.

Range. Known only from type locality.

Volutopsius regularis Dall, 1878

Plate 4, fig. 6

Proceedings of the California Academy of Sciences, 5:60; Pl. 2, fig. 6.

Shell of four whorls, obtusely fusiform, and with the last whorl somewhat inflated. Nucleus mammillated, whorls smooth, moderately convex, with a distinct, though not channeled suture. Aperture eleven-seventeenths the length of the shell, elongate, produced in front, with the outer lip moderately thickened and the inner lip without callus. Canal almost straight; short narrow. Long., 1.8; lat., .9 in.

Type in United States National Museum. Type locality, Unalaska.

Range. Pribilof, Aleutian, and Sannak Islands, Alaska.

Described as *Volutopsis beringi regularis.*

Volutopsius castaneus Mörch, 1858

Plate 4, fig. 2

Novitates Conchologia Mollusca Marina, 7; Pl. 1, figs. 1, 2.

N. testa ovata, badia tenui, laeviuscula, spira exserta, apice obtusa; anfractibus senis convexis sutura profunda divisis, plicis incrementi haud regularibus instructis, ultimo perampio; apertura magna oblonga; columella parum sinuata paullum callosa; cauda brevi lata subcurvata; labro simplici; faucibus lacteis, subroseis. Neptunea castanea Mörch in sched. Ex insula Sitka Exstata in collectione clar. Romberg Hamburgensis.

Testa unicolor badia 70 mm. longa, 36 mm. lata laeviuscula, ad longitudinem haud regulariter plicata. Anfractus sex parum tumidi, ultimos permagnus circa 7/10 longitudinis testae adaequans. Apicis formatio ut in specie antecedente.—A *Fuso* (Srromb.) *norvegico* Chemn. C. C. vol. X. pag. 3–8, Tab. 157, fig. 1497 et 1498, spira breviore, cauda minus curvata, colore obscuriore et statura minore paullo aliena differre videtur. Genus *Molluscorum neptunea* Bolten, anno 1798 creatum, omnes eos *Fusos ventrosos* sensu Lamarckinano complectitur, qui rostro brevi gaudent ut *Murex antiquus* Linnaei aliique. (Mörch.)

Shell ovate, badia, thin smoothish, spire projecting, apex obtuse; six convex whorls, divided by a profound suture, with plications of growth not regularly arranged, the last one very large; aperture large, oblong; columella slightly sinuate and barely callous; short broad tail subcurvate; outer lip simple; cheeks milk-white, subrosy. N. *Neptunea castanea* Mörch in sched.

From the Island of Sitka. Exists in the notable Romberg collection at Hamburg. Unicolored shell, of length 70 mm.; breadth not given. Smoothish, not regularly plicate longitudinally. Six whorls slightly tumid, the last one very large, equally 7/10 of the length. The form of the apex as in the preceding species. From *Fusus norvegicus* this is seen to differ in shorter spire, the tail less curved, color more obscure, smaller size. The genus of *Mollusca neptunea* of Bolten, created in the year 1798, embraces all those ventricose *Fusus* in the Lamarckian sense which possess a short rostrum, as *Murex antiquus* Linne. (Translation.)

Type in Zoölogical Museum, Copenhagen. Type locality,

Range. Pribilof, Aleutian, and Kodiak Islands and Sitka, Alaska.

Genus **BERINGIUS** Dall, 1879

Shell dextral, large solid, the spire usually longer than the aperture; the sculpture very variable but usually strong; the periostracum thin, dehiscent; the nucleus swollen, with several hardly increasing whorls forming a subcylindrical tip to the spire in most cases; aperture of moderate size, the outer lip slightly expanded and hardly thickened; pillar smooth, short, callous; canal short, wide hardly recurved; operculum smaller than the aperture, subovate with apical nucleus; radula peculiar, with an edentate rhachidian plate, the laterals formed by single strong cups with the tip incurved and two or more small blunt denticles on the inner edge near the middle. (Dall.)

Type. *Chrysodomus crebricostatus* Dall.

Distribution. Arctic to British Columbia, Japan.

Beringius crebricostatus Dall, 1887

Plate 23, fig. 1

Proceedings of the California Academy of Sciences, 7:6. *Scientific Results of the Exploration of Alaska;* Pl. 2, fig. 1, 1879.

Shell elongated, apex attenuated, blunt at the end; whorls (nuclear) three, (normal) four—total seven or more; texture porcellaneous; epidermis bright yellow-brown, shell beneath it, and at the aperture, white; columella nearly straight, smooth; outer lip hardly thickened, waved by the ridges. Sculpture composed by very prominent, revolving, flat-topped ridges, separated by channeled interspaces, which the ridges slightly overhang. There are three of these ridges on the smaller whorls, and fourteen or more on the last whorl, of which the posterior four predominate in size and strength. The tops of the ridges are waved here and there, showing a tendency to traverse costae, which, however, are not present in any of the specimens. Top of the whorls squarely shouldered by the first ridge. On the ridges are usually one or two rather deeply incised lines, and a large number of delicate striae cover the whole surface parallel with the ridges. The cylindrical form of the embryonal whorls (which are free from strong ridges) is a remarkable character, but common to *C. kennicottii* Dall. Length, 3.5; greatest width, 1.65; length of aperture, 1.65 in. Canal very short, hardly differentiated from the aperture. Siphonal fasciole none, or barely perceptible. (Dall.)

Type in United States National Museum. Type locality, Unalaska, in 100 fathoms.

Range. Plover Bay, the Aleutian Islands, and eastward to Shumagin Islands, Alaska.

This was described as a *Chrysodomus.*

Beringius crebricostatus undatus Dall, 1919

Proceedings of the United States National Museum, **56**:311.

Specimens (mostly young) differing from the typical form in having about 17 arcuate rounded ribs extending from the constricted suture to the periphery and obsolete on the base; there are also more numerous (about 18) spiral ridges, smaller and of course much closer together than in the case of the typical form. The apex of the largest specimen (about two-thirds grown) is defective, but there are five completed whorls, measuring 78 mm. long and with a diameter of 35 mm. (Dall.)

Type in United States National Museum, No. 223031. Type locality,

United States Bureau of Fisheries Station 4224, as Cygnet Inlet, Boca de Quadra, Alaska, in 160 fathoms.

RANGE. Unalaska, Alaska, south and east to British Columbia, in 238 fathoms.

Beringius kennicottii Dall, 1907

Plate 23, fig. 3

American Journal of Conchology, **7**:108. *Proceedings of the United States National Museum,* **24**; Pl. 35, fig. 3, 1902.

Shell of six whorls, which are rather shouldered but not at all carinated. Aperture one-half the length the shell or a little less. Outer lip strongly arched, forming a right angle with the body whorl, somewhat effuse anteriorly. Columella with a thick white callus, with a groove behind it, somewhat arched and twisted. Siphonal fasciole well-marked, rather narrow, canal short, recurved, rather elongated. Color of shell white, with a purple tint within. Sculpture consisting of faint, primary, revolving ridges, obsolete on the convexity, and more evident on the anterior part of the last whorl; absent on the upper whorls. Secondary sculpture of fine crenulated thread-like lines, about eighty to the inch, which are decussated by the lines of growth. The whorls are crossed by stout, waved, rounded ribs (twelve on the last whorl), which are evanescent on the anterior portion of the last whorl, roundly shouldered on the last whorl, less so on the upper ones; their anterior declivity rather sharper than their posterior slope. These ribs are a little wider than the interspaces. Epidermis yellowish-brown, thin, smooth, following the sculpture of the surface. Lat., 2.5; long., 4.5; long. of aperture, 2.4; lat. of aperture, .14 in. (Dall.)

TYPE in United States National Museum. Type locality, Captain's Harbor, Unalaska.

RANGE. Aleutian Islands to Cook's Inlet, Alaska.

Beringius kennicottii incisus Dall, 1907

Miscellaneous Collections, Smithsonian Institution, **50**:163.

Shell resembling *B. kennicottii* in nearly all features, but distinguished by the much deeper and sharper minute spiral grooving, which gives to the interspaces the aspect of minute crowded spiral threads; the axial ribs (about 15 in number) are also notably prominent and strong. Long. of shell, 75; max. lat., 35 mm. (Dall.)

TYPE in United States National Museum, No. 110488. Type locality, Station 4779, Bering Sea.

RANGE. Petrel Bank, Bering Sea, in 45 fathoms.

Beringius stimpsoni Gould, 1860

Plate 21, fig. 2

Proceedings of the Boston Society of Natural History, 7:325.

Testa magna, solidula, elongata, fusiformi-turrita, cinerea vel dilute ferruginea, epidermide calcarea caduca incrustata, lines tenuibus cincta; anfr. 6 ad 8 pyramidatis, pentagonalibus, ultimo antice excavato, costa cincto ubi undae terminantur. Apertura dimidiam longitudinis testae adaequans, anguste lunata; labro simplici; columella arcuata, callosa; fauce dilute castanea vel livida. Long., 100; diameter, 45 mm. (Gould.)

A quite remarkable species, allied to *B. undatum,* but at once distinguished by its elongated form, and its pyramidal, pentagonal whorls with concave sides. (Remarks by Gould.)

TYPE in United States National Museum. Type locality, Arikamcheche Island, Bering Straits.

RANGE. Point Barrow to Pribilof Islands, Alaska.

Described as *Buccinum stimpsoni.*

Beringius malleatus Dall, 1884

Plate 22, fig. 5

Proceedings of the United States National Museum, 7:525.

Shell long and slender, the young shell forming several whorls in an almost cylindrical coil before they begin to enlarge. The adult shell may reach 6 inches in length. The surface is covered with fine spiral striae and a thin brown epidermis. The nucleus is large and blunt, the canal short, the form of the mouth variable in different stages and specimens; the outer lip is thin, the aperture dark purple within; the last whorl less than half the length of the shell in most cases. It is generally rude and more or less worn, even when living, the cylindrical tip usually broken off, but the polygonal horizontal section of the whorls is very characteristic. (Dall.)

TYPE in United States National Museum, No. 40979. Type locality, Point Barrow, Arctic.

RANGE. Point Barrow to Pribilof Islands, Alaska.

Beringius frielei Dall, 1894

Proceedings of the United States National Museum, 17:711; Pl. 27, fig. 8.

Shell resembling *B. turtoni* in size, but with a more regularly tapered spire and deeper suture; the epidermis of a redder brown and not polished; very adherent; the sculpture is of close-set pairs of flattened spiral threads, each pair separated by a sharp channeled groove, as wide as a thread,

from the next pair, and a very narrow but sharp groove between the two threads composing the pair; transverse sculpture only of fine incremental lines; nucleus lost; aperture snow-white within; not lirate, though the external sculpture is reflected slightly close to the edge of the outer lip, which is slightly expanded; canal very short and wide; whorls six and one-half without the nucleus; operculum normal, very large, closing the aperture. Length of shell, 124; whorl, 80; max. diam., 55 mm. (Dall.)

TYPE in United States National Museum, No. 106988. Type locality, Station 3497, in Bering Sea, near the Pribilof Islands.

RANGE. Pribilof Islands, Bering Sea.

Beringius aleuticus Dall, 1894

Plate 25, fig. 2

Proceedings of the United States National Museum, **17**:711; Pl. 29, fig. 2.

Shell of about five whorls (the nucleus is lost), solid, heavy, smooth, except for faint incremental lines and occasional obscure spiral streaks; whorls rounded, covered with a yellow-brown epidermis above the suture; the part anterior to the sutural line on the last whorl is marked by paler, opaque straw color; suture deep, not channeled; the pillar heavy, white, short; the siphonal fasciole, if any, removed by erosion; canal hardly differentiated from the aperture; pillar lip white, callous; outer lip smooth, simple, slightly expanded. Length of decollate shell, 65; of last whorl, 48; max. diameter, 36 mm. (Dall.)

TYPE in United States National Museum, No. 106999. Type locality, Station 3481, near Amukhta Pass, Aleutian Islands.

RANGE. Amukhta Pass, Aleutian Islands, in 248 fathoms.

Beringius marshalli Dall, 1919

Plate 16, fig. 8

Proceedings of the United States National Museum, **56**:311. *Bulletin 112,* United States National Museum; Pl. 9, fig. 3.

Shell large and thin livid flesh color, with a dehiscent, thin, pale brownish periostracum; suture distinct, constricted, the whorl slightly flattened in front of it; spire attenuate with seven whorls exclusive of the (lost) nucleus, the apical whorls feebly irregularly axially plicate, the others with only rather conspicuous silky incremental lines; at the shoulder on the last whorl are developed low oblique irregular ridges with wider interspaces; a few also appear near the periphery; on the base there are about eight low obscure ridges with wider interspaces; aperture ovate, pinkish brown within, outer lip thin, body and pillar with a layer

of enamel, the pillar nearly straight, as in the wide short canal; the operculum large, black, with apical nucleus. Height of shell, 144; of last whorl, 78; diameter, 58 mm. (Dall.)

TYPE in United States National Museum, No. 224077. Type locality, United States Bureau of Fisheries, Station 3549, in Bering Sea.

RANGE. Pribilof Islands to Unalaska, Alaska.

Beringius indentatus Dall, 1919

Plate 21, fig. 3

Proceedings of the United States National Museum, **56**:312.

Shell large, short-spired, acute, solid, livid whitish, with a thin dehiscent pale brownish periostracum and six shouldered whorls exclusive of the (lost) nucleus; axial sculpture of (on the penultimate whorl, 14) rounded, arcuate ribs, with wider interspaces, most prominent on the shoulder but extending over the periphery almost to the canal, though somewhat irregularly disposed; other axial sculpture of rather conspicuous crowded incremental lines; spiral sculpture none, on and near the periphery of the last whorl are a few more or less obsolete irregularly divergent raised lines; aperture wide, white, throat pinkish, outer lip thin, expanded, body and pillar thickly enameled, pillar straight, canal short, shallow, wide, hardly recurved; operculum dark brown chrysodomoid, the scar of attachment relatively small. Height of shell, 110; of last whorl, 78; diameter, 58 mm. (Dall.)

TYPE in United States National Museum, No. 213315. Type locality, United States Fish Commission Station 3282, off the Khudubine Islands, Bering Sea.

RANGE. Kotzebue Sound to Aleutian Islands, also Japan.

Genus **LIOMESUS** Stimpson, 1865

Shell Bucciniform, usually solid, with a short twisted canal, smooth pillar and body, the outer lip thickened but not reflected, the operculum with apical nucleus; periostracum conspicuous, often villous. (*Proceedings of the United States National Museum,* **24**.)

TYPE. *Buccinum dalei* J. Sowerby.

DISTRIBUTION. Arctic, Pacific, and Atlantic.

Liomesus nassula Dall, 1901

Nautilus, **15**:89. *Bulletin 112,* United States National Museum; Pl. 8, fig. 6.

Shell solid, white, covered with a pale-olive, slightly-hispid periostracum, with a rather elevated, subacute spire of seven whorls; suture dis-

tinct, not channeled; apex somewhat eroded with a small blunt top; surface of the whorls delicately sculptured with fine revolving threads, four or five to a millimeter, of which about every fourth thread is perceptibly stronger than the other three; these are crossed by still finer, sharp, elevated, arcuate, incremental lines, along which the hispidity of the periostracum is arranged; pillar white, solid, twisted, funicular distally; canal very short, wide; outer lip thin, simple, with a concave-flexuosity behind the periphery; body with a thin white callus. Alt., 42; max. diam., 22; long. aperture, 17 mm. (Dall.)

TYPE in United States National Museum. Type locality, 121 fathoms near the Pribilof Islands, Bering Sea.

RANGE. Bering Sea, Pribilof Islands to Alaska in 14–121 fathoms.

Liomesus ooides Middendorff, 1848

Bulletin, Academy of St. Petersburg, **7,** No. 16:6. *Sibirische Reise,* **2**:326; Pl. 8, figs. 7, 8.

Testa alba, crassa, ovato-conica; spira abbreviata; anfractibus convexiusculis, non plicatis, ad suturas abrupte-canaliculatis, striis longitudinalibus cinctis, quarum interstitia incrementi vestigilis tenerrimis decussantur canali brevi; labio magis minusve calloso; abro crasso; apertura mediocriter aperta. Long., 25. (Middendorff.)

Shell white, thick, ovately conical; spire abbreviated; with whorls slightly convex, not plicate, abruptly canaliculate to the suture, girdled with longitudinal striae of which the interstices are cut across by very slender vestiges of growth lines; with short canal; lip more or less callous; thick; aperture moderately open. (Translation.)

TYPE in Academy, St. Petersburg. Type locality, Okhotsk Sea?

RANGE. Okhotsk Sea. Fossil: Pleistocene, of Yesso, Hokkaido, Japan.

Liomesus ooides canaliculatus Dall, 1874

Plate 2, fig. 23

Proceedings of the California Academy of Sciences, **5**:252. *Scientific Results of the Exploration of Alaska;* Pl. 4, fig. 4, 1879.

Shell solid, livid white, covered with strong, dark-brown, pilose epidermis; whorls moderately rounded; suture deeply channeled; surface of the whorls covered with fine, spiral, thread-like ridges, with still finer ones intervening between them, lightly decussated by fine, but distinct lines of growth, to which the epidermis especially adheres; the coarser ridges are about seven in number, between the posterior end of the aperture and the edge of the suture behind it. Whorls 5½, aperture half as long as the shell; internally polished; outer edge somewhat thickened; inner

lip callous; columella strongly twisted; canal short, rather wide. Long., 1.33; lat., 0.75 in. (Dall.)

TYPE in United States National Museum. Type locality, Cape Espenberg.

RANGE. Icy Cape, Arctic Ocean, to Shumagin Islands.

Described as *Buccinopsis canaliculatus.*

Liomesus nux Dall, 1877

Plate 2, fig. 22

Proceedings of the California Academy of Sciences, 7:7. *Proceedings of the United States National Museum,* 24; Pl. 38, fig. 7.

Shell short, very solid, smooth, except for microscopic revolving striae, with an ivory-like surface, which in young living specimens is covered with a beautifully reticulated, short, velvety epidermis, of a brownish color. The adult shell is white, or with a band of livid purple. Suture distinct; spire very short; whorls five, last much the largest, very rotund; outer lip thickened, smooth, projecting beyond the columella, whose anterior is smoothly and widely twisted, so that a glimpse can be had of the interior axis. Column thickened, short, somewhat arcuated, with no fasciole. Greatest length, 1.28; end of columella to tip of spire, 1.2; width, 0.8; length of aperture, 0.8; spire, 0.5 in. (Dall.)

TYPE in United States National Museum. Type locality, Aleutian Islands, in 10 fathoms.

RANGE. Aleutian Islands to Shumagin Islands, Alaska. Also Japan.

Described as *Liomesus canaliculatus.*

Genus **MOHNIA** Friele, 1878

Shell as in *Siphonorbis* or *Plicifusus,* but the whole nepionic shell smooth (it is sculptured up to the larval whorls in other species); operculum coiled, pauci-spiral; radula, with one cusp on the rhachidian and two on each lateral tooth; ovicapsules solitary, as in *Tritonofusus.* (Dall.)

TYPE. *Fusus mohnii* Friele.

DISTRIBUTION. Arctic North America.

Mohnia robusta Dall, 1913

Plate 17, fig. 3

Proceedings, Philadelphia Academy of Natural Sciences, 501. *Bulletin 112,* United States National Museum; Pl. 10, fig. 12.

Shell solid, stout, of about eight whorls, the apical ones being always eroded in adult shells; the upper whorls with fifteen to sixteen axial rounded, little elevated, nearly straight riblets, which become feebler and finally vanish on the last whorl; suture appressed, slightly constricted;

other axial sculpture of obscurely channeled grooves which become wider with age and on the penultimate whorl are about fourteen in number; on the last whorl they are coarsest on the base, but nowhere sharp or clean cut; the whole surface is covered with a dark olive periostracum, under which the shell is white; aperture ovate, the body erased white, the pillar gyrate but not pervious, the outer lip thin, sharp; the canal rather wide and strongly recurved. The nucleus is not preserved on any of the specimens. The operculum is dark horn color and forms about one whorl. Length of type specimen (about five whorls, 36.5; of last whorl, 25; maximum diameter, 15 mm. (Dall.)

TYPE in United States National Museum. Type locality, Bering Sea, in 987 fathoms, off Pribilof Islands.

RANGE. Off Pribilof Islands, in 987–1,401 fathoms.

Mohnia corbis Dall, 1913

Proceedings, Philadelphia Academy of Natural Sciences, 501. *Bulletin 112,* United States National Museum; Pl. 12, fig. 10.

Shell with the apex eroded and about five rounded whorls remaining; white, covered with an olivaceous yellow periostracum; suture appressed; axial sculpture of numerous, rather irregular, prominent incremental lines; spiral sculpture of, between the sutures, about seven cord-like ridges, which on the last whorl become flatter and strap-like; the interspaces are irregular, but usually wider; between the cord at the shoulder and the suture behind there is a flattish space with four or five obsolete finer spirals; contrary to custom, the base of the last whorl and canal have no spiral sculpture; aperture short-oval, the outer lip thin, short, the body erased white, the pillar gyrate and minutely pervious; canal very short, wide, and slightly recurved; operculum with a small subspiral nucleus. Length of shell, 31; of last whorl, 20; maximum diameter, 14 mm. (Dall.)

TYPE in United States National Museum. Type locality, Bering Sea, off the Pribilof Islands, in 1,771 fathoms.

RANGE. Off the Pribilof Islands, 1,771 fathoms.

Mohnia frielei Dall, 1891

Plate 25, fig. 8; Plate 15, fig. 5

Proceedings of the United States National Museum, 14:186; 17; Pl. 29, fig. 8, 1894.

Shell small, solid, six-whorled with short canal; white, covered with a dull-green epidermis; upper whorls with numerous fine transverse ribs, last whorl smooth, no spiral sculpture. Length, 16; breadth, 7.5; aperture and canal, 8 mm. (Dall.)

TYPE in United States National Museum. Type locality, U.S.S. "Albatross" Station 2860, off British Columbia.

RANGE. Off Queen Charlotte Islands, British Columbia, in 876 fathoms.

Mohnia vernalis Dall, 1913

Plate 8, fig. 2

Proceedings, Philadelphia Academy of Natural Sciences, 502.

Shell small, thin, white under a light-green periostracum, of about seven whorls; the apex apparently blunt, but always more or less eroded; the nepionic whorls with a few spiral grooves, the following whorl or two with about sixteen rather prominent short ribs, most prominent at the periphery, with narrower interspaces crossed by fine spiral striae with wider interspaces; the ribs rapidly become obsolete and on the last three whorls are absent, the surface being then only marked by very arcuate incremental lines, the striae becoming obsolete, except on the base near the canal where there are a few coarse spirals; aperture short-ovate, the outer lip thin, sharp, the body erased, the canal short, wide, slightly recurved, the pillar gyrate, minutely pervious; the operculum with a subspiral nucleus. Length of five whorls (the apex being eroded), 21; of last whorl, 14; maximum diameter, 10 mm. (Dall.)

TYPE in United States National Museum. Type locality, off Tillamook Bay, Oregon, in 786 fathoms.

RANGE. Tillamook Bay, Oregon, to Monterey, California, 786–881 fathoms.

Mohnia siphonoidea Dall, 1913

Plate 14, fig. 7

Proceedings, Philadelphia Academy of Natural Sciences, 502. *Bulletin 112,* United States National Museum, Pl. 12, fig. 11.

Shell solid, rotund, white, with an olivaceous polished periostracum, and with about six whorls; apex eroded, apparently blunt; sculpture of faint incremental lines and sparse zigzag obsolete ridges recalling those of *Tritonofusus hypolispus* Dall, but less distinct; whorls rather flattish, aperture ovate; outer lip slightly reflected, body with a thin layer of callus, pillar gyrate, not pervious, canal short, recurved. Operculum with a small subspiral nucleus. Length (eroded), 34; length of last whorl, 26; maximum diameter, 15 mm. (Dall.)

TYPE in United States National Museum. Type locality, Bering Sea, off Pribilof Islands, in 987 fathoms.

RANGE. Known only from type locality.

Mohnia exquisita Dall, 1913

Plate 17, figs. 4, 5

Proceedings, Philadelphia Academy of Natural Sciences, 502. *Bulletin 112,* United States National Museum; Pl. 10, figs. 10, 11.

Shell delicate, white under a greenish periostracum, with about seven whorls; suture not appressed; axial sculpture of incremental lines which cut the spiral keels and minutely serrate their edges occasionally; spiral sculpture, fundamentally of two prominently elevated keels; one at the shoulder recurved, the other vertical to its base; with ten or twelve not prominent spiral cords on the base. In one specimen the space between the keels has no spiral sculpture, in another there are one or two minor keels and numerous faint spirals; this specimen also has a minor keel marginating the base. Aperture rather small, the outer lip sharp, thin, modified by the keels; inner lip erased, white; pillar gyrate, minutely pervious; canal short, wide, hardly recurved. Operculum with subspiral nucleus and much transparent enamel on the margin of the proximal surface. Length, 31; length of last whorl, 20; maximum diameter, 14 mm. (Dall.)

TYPE in United States National Museum. Type locality, Bering Sea, off Koniugi Islands, in 1,766 fathoms.

RANGE. Bering Sea, off Koniugi Island, Aleutians, in 1,766 fathoms.

Genus **ANCISTROLEPIS** Dall, 1894

Shell buccinoid, with a short twisted canal; operculum straight, claw-shaped, concave, with apical nucleus; penis on a short stalk with the distal extremity enlarged, foot-shaped, solid, without curved or attenuated point. (Dall.)

TYPE. *C. eucosmius* Dall.

DISTRIBUTION. Bering Sea to San Diego, California.

Ancistrolepis eucosmius Dall, 1891

Plate 25, fig. 7

Proceedings of the United States National Museum, **14**:187; **17**; Pl. 29, fig. 7, 1894.

Shell white, solid, strong, seven-whorled, with a lamellose epidermis raised in lines with spaces between them along the incremental lines, the edges of the lamellae fringed with projecting points. Upper whorl with a space in front of the suture and three strong sharp carinae, the first interspaces wider than the others; on the first whorl are seven or eight spirals, feebler anteriorly; epidermis yellowish olive, throat and pillar white, canal very short, operculum straight, unciform. Length of shell, 33; of aperture, 14; breadth, 18 mm. (Dall.)

TYPE in United States National Museum. Type locality, U.S.S. "Albatross" Stations 3227 and 2919, off Unalaska Island.

RANGE. Pribilof Islands, Alaska, to Tillamook Bay, Oregon.

Ancistrolepis eucosmius bicinctus Dall, 1919

Proceedings of the United States National Museum, **56**:312.

Shell resembling typical eucosmius, but with, on the spire, only two strong spiral ridges, equidistant from the sutures, and on the base three more adjacent, smaller, and diminishing in size and separation toward the canal. The surface is covered with a delicately reticulated, velvety periostracum of a pale olive color over white shelly matter. Operculum is normal. Height, 28; diameter, 17 mm. (Dall.)

TYPE in United States National Museum, No. 122673. Type locality, United States Fish Commission Station 3337, southeast of Unalaska.

RANGE. Pribilof Islands to Shumagin Islands, Alaska, in 34–280 fathoms.

Ancistrolepis magnus Dall, 1895

Plate 25, fig. 5

Proceedings of the United States National Museum, **17**:709; Pl. 29, fig. 5.

Shell rather thin, with six whorls, covered by a thick pilose epidermis; whorls flattened or channeled near the suture and with a single strong keel at the shoulder, the surface covered with fine spiral threads crossed by rather prominent lines of growth; pillar short, normally much twisted and the coil pervious for one whorl, but some specimens attacked by annelids have it nearly buccinoid; aperture ample, the body with more or less callus laid over it, the outer lip not reflected; siphonal fasciole rather indistinct; operculum solid, black, rather short, concave, its outline like that of a half-shut fan. Height of shell, 75; max. diam., 50; length of aperture, 47 mm. (Dall.)

TYPE in United States National Museum, Nos. 122674 and 122675. Type locality, Station 3254, in Bering Sea.

RANGE. Okhotsk and Bering Seas, 25–70 fathoms.

Ancistrolepis californicus Dall, 1919

Plate 9, fig. 9

Proceedings of the United States National Museum, **56**:313.

Shell of moderate size, solid, white, with an olivaceous periostracum, with about seven whorls, excluding the (defective) nucleus, with the

sutural channel almost obliterated; apical whorls with two, later whorls with three, strong but not sharp carinae, revolving nearly equidistant between the sutures, the posterior carina slightly smaller than the others; on the base are about half a dozen similar carinae beside the small spiral threads on the canal; other spiral sculpture of minute striae and threads pretty uniform; axial sculpture if faint irregular incremental lines on which the periostracum is sometimes raised; aperture white, internally reflecting the stronger sculpture; outer lip thin, not reflected, body erased, pillar short, strong, sharply twisted, with a short wide canal. Height of shell, 46; of last whorl, 33; diameter, 30 mm. (Dall.)

TYPE in United States National Museum, No. 122667. Type locality, United States Fish Commission Station 2919 in 984 fathoms, near Cortez Bank.

RANGE. Straits of Juan de Fuca to San Diego, California, in 152–984 fathoms.

Ancistrolepis beringianus Dall, 1919

Plate 21, fig. 1

Proceedings of the United States National Museum, **56**:313.

Shell large, solid, livid whitish, with a long acute spire, the apex defective, but the shell had more than six whorls, separated by a very narrow deep suture and covered by a very thin pale olivaceous periostracum; whorls well-rounded, with four or five nearly obsolete flattish spiral ridges between the base and the shoulder, with wider interspaces, the base delimited by a stronger cord, in front of which are eight or ten similar flattish spirals more closely set. There is also a very minute scratchy spiral striation; axial sculpture only of rather rude incremental lines; aperture short and wide, the outer lip thin, not expanded, the body erased, the pillar short, white, twisted, the axis not quite pervious, and with a feeble fasciole. Height of five whorls, 98; of last whorl, 66; of aperture and short wide canal, 51; diameter, 52 mm. (Dall.)

TYPE in United States National Museum, No. 205401. Type locality, United States Fish Commission Station 4794, western Bering Sea.

RANGE. Bering Sea, off Starichkoff Island.

Genus **SULCOSINUS** Dall, 1894

Shell thin, with a deeply channeled suture, strongly reflected lip, and thick parietal callous deposit. (Dall.)

TYPE. *Buccinum taphrium* Dall, 1891.

DISTRIBUTION. Arctic, West America.

Sulcosinus taphrius Dall, 1891

Proceedings of the United States National Museum, **14**:186; **17**:707; Pl. 29, fig. 6, 1895.

Shell thin, slender, with polished brown epidermis, with fine spiral striae and conspicuous zigzag or spiral malleations; six-whorled, acute; suture deeply channeled; aperture white, with thick reflected lip and continuous thick callus on the concave pillar. Length of shell, 40; breadth, 18; length of aperture, 15 mm. (Dall.)

TYPE in United States National Museum. Type locality, U.S.S. "Albatross" Station 3330, off Akutan Island, Bering Sea.

RANGE. Bering Sea, off Unalaska, in 351 fathoms.

Genus **EXILIA** Conrad, 1860

Shell elongate, very slender, with numerous whorls, chrysodomoid nucleus, and a straight canal; periostracum conspicuous, polished sculpture of numerous, fine, flexuous, axial ribs and spiral striation; aperture small, simple, not lirate within, outer lip thin, sharp, not reflected; inner lip and pillar smooth, without plications or denticles of any sort; operculum long, slightly arcuate, with apical nucleus. (Dall.)

TYPE. *Exilia pergracilis* Conrad.

DISTRIBUTION, Atlantic and Pacific, North America. Fossil: Eocene, Alabama; Pliocene, California.

Exilia kelseyi Dall, 1908

Plate 13, fig. 6

Proceedings of the United States National Museum, **34**:249.

Shell elongate, slender, acute, the spire much longer than the aperture; white, covered by an ovilaceous periostracum; having ten whorls exclusive of the (eroded) nucleus of about two whorls; suture appressed and the whorls slightly constricted in front of it; axial sculpture of (on the seventh whorl about 12) concavely arcuate, slightly protractive, low narrow ribs, crossing the whorls, on the later whorls becoming obsolete and finally absent from the last whorl altogether; the interspaces are wider than the ribs; these are crossed by fine sharp spiral striae, somewhat irregularly spaced, of which there are about a dozen on the seventh whorl, a narrow space before the suture being less sharply or not at all striate; aperture narrow, outer lip arcuate, somewhat excavated near the suture and produced anteriorly, slightly thickened, simple, and internally smooth; inner lip smooth, with sculpture erased, passing gradually into the long straight pillar, which is attenuated in front; canal long, narrow, straight.

Length of shell, 34; of last whorl, 18.5; of aperture, 14.5; max. diam., 8 mm. (Dall.)

TYPE in United States National Museum, No. 110631. Type locality, off San Diego, in 124–359 fathoms.

RANGE. Bodega Head to San Diego, California. Fossil: Pleistocene of San Pedro.

Exilia rectirostris Carpenter, 1865

Plate 6, fig. 7; Plate 28, fig. 2

Proceedings, Philadelphia Academy of Natural Sciences, **64**. *Proceedings of the United States National Museum,* **21**; Pl. 34, fig. 2.

?Chr. t. parva albida, carneo maculata, gracili epidermide tenui, cornea in duta; anfr. nucleosis? . . . (decollatis;) anfr. normalibus vi. planatis, suturis parum distinctis; adolescente, costulisradiantibus circiter xiv. latis haud expressis, adulta obsoletis; lincis spiralibus haud conspicuis; apertura elongato-pyriformi, in canalem valde productum, apertum, rectum, subito attenuata; labro acuto, parum arcuato, haud sinuato; labio inconspicuo. Long., .88; long. spir., .43; lat., .32. (Carpenter.)

The shell is white, with a polished olive-brown periostracum and a tinge of reddish-brown within the aperture. It is frequently eroded, especially near the apex, and the long slender canal is frequently distorted by fracture and repair. (Dall.)

TYPE in United States National Museum, No. 4815. Type locality, Puget Sound.

RANGE. Behm Canal, Alaska, to Cape San Quentin, Lower California.

Genus **PLICIFUSUS** Dall, 1902

Shell strongly plicate axially, smooth or spirally sculptured, usually with an inconspicuous periostracum; nucleus Chrysodomoid; aperture ample, the outer lip markedly flexuous behind, slightly expanded, simple, sharp; the pillar callous, the canal slightly twisted and recurved, moderately long; operculum as in *Colus.* (Dall, 1918.)

TYPE. *Fusus kroyeri* Möller, 1842.

DISTRIBUTION. Arctic Seas.

Plicifusus kroyeri Möller, 1842

Index Molluscorum Grönlandiae, **15**. Tryon, *Manual of Conchology,* **3**; Pl. 53, fig. 335.

Testa fusiformi, tereti, rufofusca; anfr. 7½ convesis, inferne lineis undulatie impressis longitudinalibus cinctis; spira elongata, exserta, costulato-rugosa. Long., 25‴ (Rs. Möller.)

Grayish white under a smooth, thin, brownish epidermis. Length, 91 mm. (Tryon, *Manual of Conchology.*)

TYPE in Zoölogy Museum, Copenhagen. Type locality not known to writer.

RANGE. Point Barrow, Arctic Ocean; circumboreal.

This was described as *Sipho kroyeri.*

Plicifusus arcticus Philippi, 1850

Abbildungen und Beschreibungen neue oder wenig gekannte Conchylien, **3**: 119; Pl. 5, fig. 5.

Testa fusiformi, gracili, rufo-cornea, plicis longitudinalibus confertis, striisque transversis impressis, confertissimis sculpta; anfractibus modice et aequaliter, convexix; apertura ovato-oblonga, intus laevissima; labio distincto nullo; canali dimidiam aperturam vix aequante. (Philippi.)

Shell fusiform, slender, reddish-brown, sculptured with close-set longitudinal and impressed cross striae; whorls moderately and equally convex, aperture ovate oblong within very smooth, with no distinct lip, canal scarcely equaling the half of the aperture. (Translation.)

TYPE in? Type locality not known to writer.

RANGE. Arctic Ocean, Bering Sea, Aleutian to Shumagin Islands, Alaska; circumboreal.

Plicifusus johanseni Dall, 1919

Plate 14, fig. 4

Scientific Results of the Canadian Arctic Expedition, **8**: 21; A, Pl. 3.

Shell fusiform, whitish, with six or more slightly rounded whorls exclusive of the (lost) nucleus; suture distinct, not appressed or channeled; but rather deep; the first three or four whorls are feebly axially plicate, the obscure riblets anteriorly protractive and varying in number up to ten; very faint irregular traces of them, or some of them, may appear on the last whorl; spiral sculpture of numerous, strap-like, flat lines; spiral made duplex by a medial groove and separated by much narrower interspaces crossed by fine incremental lines; canal short, slightly recurved; outer lip arcuate, somewhat produced below the periphery; body and pillar with a coating of enamel; pillar attenuated in front, nearly straight. Length of (decollate) specimen, 52; of last whorl, 39; of aperture, 26; max. diam., 22 mm. (Dall.)

TYPE in Ottawa. Type locality, Point Barrow sandspit, Alaska.

RANGE. Point Barrow to Icy Cape, Arctic Ocean.

Plicifusus verkruzeni Kobelt, 1876

Jahrbuch der Malakozoologische Gesellschaft, 1876, 70; Pl. 2, fig. 1.

Testa ovato-turrita, cauda brevissima, solida, fere laevis; anfr. 8+, rotundatis, leniter accrescentes, ultimus dimidiam testae non aequans, ad suturam parum impressi, oblique striatuli, spiraliter sub lente vix conspicue striati, sutura subcanaliculata; apex obtusulus, summo minuto, conico; apertura ovata in canalem brevem, patulum desinens, labro simplice, faux laevi, columella superne parum, inferne fortiter callosa, parum arcuata. Sordide albida, epidermide tenuissima, laevi, flavo-viridescente induta, apertura roseo-albida. Operculum tenue, corneum, subovatum, nucleo ad apicem inferiorem sito, striis conspicuis. Long. spec. majoris, 50; lat. max., 22; alt. apert., 20 mm. (Kobelt.)

Shell ovately turreted, with a very short solid canal, almost smooth; with 8 rotund whorls, increasing slowly in size, the last not equaling the half of the shell, little impressed at the suture, obliquely striate, spirally scarcely conspicuously striate under the lens, suture subcanaliculate; apex slightly obtuse, apex minute, conical; aperture ovate, extending into a broad canal; with simple lip, mouth or throat smooth, columella above little and below strongly callous, little arcuate. Dully whitish, covered with a very thin epidermis, smooth, greenish-yellow, aperture roseate-white. Operculum thin, corneous, subovate, nucleus situated on the lower apex, with conspicuous striae. (Translation.)

Type in Museum Frankfurt. Type locality, Arctic.

Range. Arctic Ocean to Bering Strait; circumboreal.

Subgenus Retifusus Dall, 1916

Plicifusus incisus Dall, 1919

Plate 13, fig. 5

Proceedings of the United States National Museum, **56**:314.

Shell of moderate size, whitish, with a yellowish-brown periostracum and about seven well-rounded rapidly increasing whorls, the nucleus eroded; suture distinct, deep; axial sculpture of numerous retractively arcuate small plications with subequal interspaces, extending from suture to suture, but becoming obsolete on the last part of the last whorl; the incremental lines evident but not conspicuous; spiral sculpture of (on the penultimate whorl about 8) flattish pairs of spirals divided by a shallow groove and the pairs separated by deeper, narrower, somewhat channeled grooves; between these and the preceding suture is a narrow band of closer threads; the former sculpture extends to the canal with much uni-

formity; aperture rather wide, the outer lip arcuate thin simple; the body with a thin layer of callus; the pillar straight; the canal short, wide, recurved; operculum normal, with a glazed border on the inner side. Height of shell, 38; of last whorl, 26; of aperture, 19; diameter, 18 mm. (Dall.)

TYPE in United States National Museum, No. 225614. Type locality, United States Fish Commission Station 3643, western Bering Sea.

RANGE. Arctic Ocean to Bering Sea to Shumagin Islands.

Plicifusus virens Dall, 1877

Plate 4, fig. 8

Proceedings of the California Academy of Sciences, 7:6. *Scientific Results of the Exploration of Alaska;* Pl. 2, fig. 3, 1879.

Shell small, similar to the last species (*C. brunneus*) in general characters, but covered with a grass-green epidermis, tinged with livid brown in some specimens. The canal is more clearly defined, the aperture much shorter and rounder, the ridges and grooves less prominent and clearly defined. The costae are more arcuated posteriorly, and the embryonic whorl larger, with revolving threads, instead of being smooth. Whorls five and a half. Costae, nine to eleven on the last whorl; ridges more numerous than in the last species, but almost too faint to count. Length, .65; width, .34; canal and aperture, .37; spire, .3; width of aperture, .17; length without the canal, .18 in. (Dall.)

TYPE in United States National Museum. Type locality, Kyska Harbor, in 10 fathoms.

RANGE. Bering Sea to Middleton Island, Alaska.

This was described as a *Chrysodomus.*

Plicifusus oceanodromae Dall, 1919

Plate 9, fig. 3

Proceedings of the United States National Museum, 56:314.

Shell of moderate size, bucciniform, acute, white, of about seven whorls, moderately rounded, the suture, not appressed; axial sculpture of (on the last whorl, about 22) narrow, rounded, retractively arcuate ribs, with subequal interspaces, extending from the suture to the base; incremental lines not prominent; spiral sculpture of close-set flattish threads of somewhat irregular strength, often medially grooved, and having a tendency to associate in groups of two or three, these cover the whole surface; aperture buccinoid, retractively conspicuously waved near the suture, protractively arcuate beyond; throat white, body with a glaze, pillar slightly arcuate, canal wide recurved; operculum with apical nucleus. Height of shell, 34; of last whorl, 25; of aperture, 17; diam., 16 mm. (Dall.)

TYPE in United States National Museum, No. 205923. Type locality, United States Fish Commission Station 4777, on Petrel Bank, Bering Sea.

RANGE. Petrel Bank, Bering Sea, to Aleutian and Shumagin Islands.

SECTION MICROFUSUS Dall, 1916

Plicifusus brunneus Dall, 1877

Plate 28, fig. 1

Proceedings of the California Academy of Sciences, 7:6. *Scientific Results of the Exploration of Alaska;* Pl. 2, fig. 4, 1879.

Shell small, yellow-brown, sculptured with revolving rounded ridges, separated by incised lines, and by transverse, rather narrow, slightly waved costae, which become obsolete on the periphery of the last whorl. Canal short; aperture lunate or elongate oval; outer lip crenate, rather thin; inner lip smooth. Whorls six, rounded; suture conspicuous with the rounded posterior ends of the costae, rendering it wavy; ridges, eight on the fifth whorl, twice as numerous on the last whorl. Costae, about fourteen on the last whorl. Length, .7 in.; width, .32; canal and aperture, .35 in; spire, .35 in. (Dall.)

TYPE in United States National Museum. Type locality, Nunivak Island, Bering Sea, in 10 fathoms.

RANGE. Port Clarence, Bering Strait, to Nunivak and the Pribilof Islands.

Described as a *Chrysodomus.*

SECTION LATIFUSUS Dall, 1916

Plicifusus griseus Dall, 1877

Proceedings of the United States National Museum, 12:322; Pl. 5, fig. 6.

Shell thin, solid, rather acutely pointed when perfect, but almost invariably eroded at the tip, eight-whorled, covered with an olive-gray epidermis, the substratum, pillar throat, and reflected lip milk-white; nucleus eroded, small; suture distinct, not appressed or channeled; whorls full and rounded; transverse sculpture of twenty to twenty-five, narrow, somewhat irregular, arcuated, wave-like ribs, which on the earlier whorls often reach from suture to suture but are strongest on the periphery; some specimens have them faint, others, the majority have them strong, but in all they become more or less obsolete on the last whorl; spiral sculpture of rather coarse, rounded, not much elevated cinguli, with narrow interspaces, slightly reticulated by the incremental lines; variable in strength

but usually covering the whole surface; in five young specimens the surface over the sculpture is somewhat polished; in adults it has a more rude appearance; aperture oval, wide; the outer lip flexuous as in *Buccinum*, more or less (in some specimens, very much) reflected; margin simple, smooth; body polished, the surface slightly excavated and glazed; pillar thin, simple, twisted; the axis widely pervious in the young, minutely or not at all in the adult; canal short, wide, slightly recurved; there is no siphonal fasciole; operculum large, thin ovoid, slightly curved, with an apical nucleus. Max. long. of shell, 32; of altitude, 18 mm. (Dall.)

TYPE in United States National Museum. Type locality, United States Fish Commission Station 2839, near the islands off Santa Barbara, California, in 414 fathoms.

RANGE. Bering Sea, in 27 fathoms, to San Diego, California, in 636 fathoms.

SECTION HELICOFUSUS Dall, 1916

Plicifusus laticordatus Dall, 1907

Plate 13, fig. 4

Miscellaneous Collections, Smithsonian Institution, **50**:161.

Shell a deeply orange-tinted, with four whorls, strongly recurved, short canal, but with the spirals about twice as wide as in the type, flat above and with distinctly channeled interspaces in which the incremental lines are strong. Long. of shell, 20; max. lat., 11; and of the last whorl, 15; aperture, 11 mm. (Dall.)

TYPE in United States National Museum, No. 122664. Type locality, Station 3279, in 41 fathoms, Bristol Bay, Alaska.

RANGE. Bering Sea to Straits of Juan de Fuca.

Genus **COLUS** Bolten, 1798

Shell long-fusiform, slender, with numerous moderately rounded whorls, the nucleus chrysodomoid, the shell structure usually white, often with a chalky external layer under a conspicuous, usually brownish, adherent periostracum; sculpture spiral, seldom very strong, sometimes nearly obsolete, never axially plicate or ribbed; aperture of moderate size, the outer lip simple, acute, not thickened or reflected, rarely slightly expanded; pillar smooth, the inside of the outer lip not lirate or denticulate; canal varying in length, usually somewhat tortuous or, when short, recurved; operculum filling the aperture, formed as in *Chrysodomus*. (Dall.)

TYPE. *Murex islandicus* Gmelin.

RANGE. Arctic to San Diego, California; circumboreal.

Subgenus AULACOFUSUS Dall, 1918

Colus spitsbergensis Reeve, 1855

Plate 4, fig. 7

Last of the Arctic Voyages, 395; Pl. 32, figs. 6*a*, 6*b*.

Testa fusiformi-turrita, canali breviusculo, vix recurve, spirae suturis impressis, anfractibus rotundatis, spiraliter costatis, subfuniculatis, versus aperturam sulco superficiario obsolete divisis, interstitilis excavatis, apertura, ovato, labro perculiariter effuso; fulvo-fusca, costis subnitentibus, columella roseo pallide tincta. (Reeve.)

Shell fusiform-turreted, canal rather short, scarcely excurved, sutures of spire impressed, whorls rounded, spirally costate, subfuniculate, toward the aperture divided obsoletely by a superficial sulcus; interstices excavate, aperture ovate, with peculiarly effuse lip; yellowish-gray, with ribs somewhat spiny, columella palely tinted with rose. (Translation.)

TYPE in British Museum. Type locality, Spitzbergen.

RANGE. Arctic Ocean to Straits of Juan de Fuca; also Japan; circumboreal.

Described as *Buccinofusus*.

Colus periscelidus Dall, 1891

Plate 15, fig. 6

Proceedings of the United States National Museum, **14**:187; **17**; Pl. 27, fig. 6, 1894.

Like a diminutive *C. spitsbergensis,* white with yellowish epidermis, five strong spirals on upper and ten on last whorl with deep channels between them. Whorls eight, canal short, aperture grooved to correspond with the external spirals; throat white; whorls rounded, spire acute. Length of shell, 46; of aperture, 19; breadth, 19 mm. (Dall.)

TYPE in United States National Museum. Type locality, U.S.S. "Albatross" Station 2842, off Akutan Islands, Alaska.

RANGE. Commander and Aleutian Islands eastward to Sannak, Alaska.

Colus herendeeni Dall, 1902

Plate 4, fig. 10

Proceedings of the United States National Museum, **24**:527; Pl. 36, fig. 10.

Shell with about nine whorls, a slender spire, small but not planorboid nucleus, and pale-olive periostracum. It is pinkish-white with a yellowish substratum and the periostracum is dull and without polish or villosity; lines of growth distinct, spiral sculpture of fine striae with wider flattish

interspaces, alternately coarser on the base; suture deep, the whorls below it often obscurely puckered near the suture; canal rather short, wide recurved. Alt., 70; diam., 28 mm. (Dall.)

TYPE in United States National Museum, No. 107006. Type locality, Bering Sea and Aleutian Islands.

RANGE. Southern Bering Sea, Nunivak Islands to Aleutian Islands, Alaska.

Colus nobilis Dall, 1919

Plate 24, fig. 4

Proceedings of the United States National Museum, **56**:315.

Shell large, regular, acute, whitish, with a warm yellow-brown persistent periostracum with eight whorls, exclusive of the very minute (lost) nucleus, separated by a very sharply defined suture, and elegantly rounded; spiral sculpture of (on the penultimate whorl, about 15) flattened, revolving, close-set cords either in pairs or medially grooved for the most part, practically uniform over the whole shell; axial sculpture only of fine silky incremental lines; aperture rather wide, the outer lip expanded, thin, more or less crenulated internally by the effect of the external sculpture; body and pillar with a thick, continuous coat of enamel; canal distinct, short, slightly recurved; operculum solid, blackish, with apical nucleus. Height of shell, 85; of last whorl, 55; of aperture, 43; diameter, 38 mm. (Dall.)

TYPE in United States National Museum, No. 222983. Type locality, United States Fish Commission Station 3484, in Bering Sea.

RANGE. Near Pribilof Islands, in 60 fathoms.

Colus calameus Dall, 1907

Plate 7, fig. 4

Miscellaneous Collections, Smithsonian Institution, **50**:158. *Bulletin 112,* United States National Museum, Pl. 10, fig. 5.

Shell thin, white, covered with a straw-yellow periostracum and having about six well-rounded whorls; suture very distinct; apex eroded, nucleus apparently small; sculpture entirely spiral, of (between the sutures on the penultimate whorl, 12) flattish, low, equal, slightly rounded, spiral ridges, separated by narrower, subequal, channeled interspaces and crossed only by faint incremental lines; aperture milk-white, the body with an eroded polished area, the pillar thick and white, twisted and recurved anteriorly; canal wide, short, with no siphonal fasciole; outer lip thin, slightly reflected. Long. of shell (tip eroded), 57; of last whorl, 42; of aperture, 32; max. diam., 28; of aperture, 14 mm. (Dall.)

TYPE in United States National Museum, No. 110478. Type locality, Station 4797, in 682 fathoms, Okhotsk Sea.

RANGE. Western Bering Sea, off Starichkoff Island.

Colus ombronius Dall, 1919

Plate 9, fig. 5

Proceedings of the United States National Museum, **56**:315.

Shell of moderate size, white with a dull olive-gray periostracum, of more than six well-rounded whorls, the nucleus missing, the aperture longer than the spire; suture distinct; not appressed; axial sculpture of rather strong, regular and regularly spaced incremental lines, which minutely corrugate the spirals; spiral sculpture of (on the penultimate whorl, about a dozen) flattish cords, equal and equally spaced with much narrower interspaces; on the last whorl, especially near the periphery, these cords have a tendency to become keeled and the interspaces wider; aperture ovate, simple, the outer lip slightly expanded and reflecting the external sculpture, throat white, inner lip enameled, pillar twisted, almost pervious; canal two-thirds as long as the rest of the aperture, well-recurved. Height of shell, 50; of last whorl, 37; of aperture, 30; diam., 21 mm. (Dall.)

TYPE in United States National Museum, No. 213239. Type locality, United States Fish Commission Station 3252, in Bering Sea.

RANGE. Eastern Bering Sea, from Nunivak Islands to Bristol Bay and Pribilof Islands.

Colus bristolensis Dall, 1919

Plate 8, fig. 8

Proceedings of the United States National Museum, **56**:316.

Shell small, white, under an olivaceous periostracum, with six rounded whorls and a very minute (decorticated) nucleus; suture distinct, not appressed; spiral sculpture of (on the penultimate whorl, about 14) shallow grooves, becoming fainter on the last whorl, with much wider flat interspaces; axial sculpture of faint incremental lines; aperture wide, semilunate, the outer lip sharp, thin, arcuate; body with a thin coat of whitish enamel; pillar short, twisted, attenuated in front; canal short, wide, recurved. Height of shell, 23.5; of last whorl, 18; of aperture, 13; diameter, 11.5 mm. (Dall.)

TYPE in United States National Museum, No. 213254. Type locality, United States Fish Commission Station 3252, in Bering Sea.

RANGE. Pribilof Islands to Unimak Island, Alaska, in 27–62 fathoms.

Colus esychus Dall, 1907

Plate 7, fig. 5

Miscellaneous Collections, Smithsonian Institution, **50**:159. *Bulletin 112,* United States National Museum; Pl. 10, fig. 8.

Shell slender, acute, solid, of a pinkish-brown color, and about eight moderately convex whorls; apex more or less eroded, acute, the suture not deeply constricted; sculpture of numerous fine, narrow, flattish spiral ridges, with a tendency to pair, separated by narrower, not channeled interspaces; the sculpture is distinct but not strong; there are about 25 spirals on the penultimate whorl, of which perhaps one-third are rendered duplex by a radial groove; aperture ovate, livid pink, the outer lip slightly reflected; pillar slender, strongly twisted, and almost pervious; canal contracted and recurved. Long. of shell, 52; of last whorl, 33; of aperture, 24; max. diam. of shell, 21; of aperture, 10 mm. (Dall.)

TYPE in United States National Museum, No. 110479. Type locality, Stations 4791 and 4792, off Bering Island.

RANGE. Point Barrow, Arctic Ocean, to Bering Island.

Colus roseus Dall, 1877

Plate 4, fig. 4

Proceedings of the California Academy of Sciences, **7**:7. *Scientific Results of the Exploration of Alaska;* Pl. 3, fig. 5, 1879.

Shell small, of a rosy color when fresh, smooth to the touch, elegantly proportioned. Whorls six, well-rounded, but not inflated; suture distinct; apex not mammillate, but evenly and elegantly rounded off. Sculpture consisting of delicate, evenly distributed revolving grooves, with wide interspaces, of which there are thirty or forty on the last whorl; these are crossed by faint lines of growth. Aperture rounded-ovate, outer lip thin, columella arcuated, polished, not thickened; canal very short and wide. Fasciole none. Length, 0.9; width, 0.45 in.; spire a trifle shorter than the aperture plus canal. (Dall.)

TYPE in United States National Museum. Type locality, Arctic Ocean.

RANGE. Off Cape Lisburne, Arctic Ocean, 10–15 fathoms.

This was described as a *Chrysodomus.*

Colus barbarinus Dall, 1919

Plate 8, fig. 5

Proceedings of the United States National Museum, **56**:316.

Shell small, solid, pale gray, of about six whorls, the nucleus compressed axially and rather acute, suture distinct, not appressed, whorls

conspicuously rounded; there is no axial sculpture except faint incremental lines, the apical whorls are decorticated; spiral sculpture of incised lines with slightly rounded wider interspaces, about a dozen on the penultimate whorl quite uniform over the whole of the last whorl; aperture ovate, outer lip thin, sharp; inner lip erased, white; pillar short, twisted; canal short, rather wide, sometimes recurved. Height of shell, 20; of last whorl, 14; of aperture, 10; diameter, 9 mm. (Dall.)

TYPE in United States National Museum, No. 334438. Type locality, United States Fish Commission Station 3282, off Khudubine Island, Bering Sea.

RANGE. Southern Bering Sea to off Khudubine Island, in 53 fathoms.

Colus sapius Dall, 1919

Plate 8, fig. 10

Proceedings of the United States National Museum, **56**:317.

Shell small, thin, the apical whorls eroded, but six prominently rounded turns remain; suture distinct, not appressed, the whorl in front of it flattened and without spiral sculpture for a short distance; the shell is white with a straw-colored periostracum; axial sculpture of faint incremental lines; spiral sculpture of (on the penultimate whorl, about eight) strong squarish cords with subequal, rather deep, channeled interspaces, both slightly wrinkled by the incremental lines and obsolete on the canal; there are a few minor spirals behind the posterior cord; aperture roundly ovate, outer lip thin, simple, inner lip erased, pillar white, twisted, axis pervious; canal rather long, narrow, well-defined, somewhat recurved. Height of shell, 22; of last whorl, 15; diameter, 11 mm. (Dall.)

TYPE in United States National Museum, No. 122597. Type locality, United States Fish Commission Station 2859, southwest of Sitka, Alaska.

RANGE. Off Sitka, Alaska, in 1,569 fathoms.

Colus calathus Dall, 1919

Proceedings of the United States National Museum, **56**:317. *Bulletin 112,* United States National Museum; Pl. 8, fig. 2.

Shell small, thin, white under a straw-colored periostracum, with more than six well-rounded whorls, the apex defective; suture distinct, not appressed; axial sculpture of faint incremental lines; spiral sculpture of (on the penultimate whorl, 13) fine, rounded, low, subequal cords with narrower interspaces, the cords at and below the periphery a little more close-set, this sculpture covering the whole shell very evenly; aperture

wide, the outer lip thickened and slightly crenulated by the external sculpture, body erased; pillar short, attenuated in front; canal short, wide, slightly recurved. Height of shell, 26; of last whorl, 18; of aperture, 12; diameter, 13 mm. (Dall.)

TYPE in United States National Museum, No. 106864. Type locality, United States Fish Commission Station 2853, near Shumagin Islands, Alaska.

RANGE. Known only from type locality.

Colus capponius Dall, 1919

Plate 9, fig. 2

Proceedings of the United States National Museum, **56**:317.

Shell of moderate size, the spire longer than the aperture, white, with a thin, polished, olivaceous periostracum, and more than five whorls (the apex defective); whorls moderately rounded, suture distinct, deep; axial sculpture of fine silky incremental lines, sometimes with a tendency to cause wrinkles near the suture; spiral sculpture of (on the penultimate whorl, about 17) regular, narrow, rather deep grooves, with much wider flattish interspaces, uniformly covering the whole surface of the shell; aperture about twice as long as wide, outer lip retractively arcuate behind and protractively anteriorly, not reflected; pillar lip with a thin glaze, pillar white; canal short, wide, hardly reflected. Height of shell, 40; of last whorl, 27; of aperture, 18; diameter, 18 mm. (Dall.)

TYPE in United States National Museum, No. 108980. Type locality, Bering Strait, near Port Clarence.

RANGE. Known only from type locality.

Colus acosmius Dall, 1891

Plate 15, fig. 3

Proceedings of the United States National Museum, **14**:188; **17**; Pl. 27, fig. 3, 1894.

Shell elongated, with six or seven whorls covered with a dull greenish epidermis and spirally sulcate with rather distant, narrow, shallow grooves, eighteen to twenty on the penultimate whorl; suture distinct, whorls flattened, canal very short and recurved; aperture white, without callus, lip hardly reflected. Length of shell, 60; of aperture, 25; breadth, 23 mm. (Dall.)

TYPE in United States National Museum. Type locality, U.S.S. "Albatross" Station 3329, off Unalaska Islands, Bering Sea.

RANGE. Off Pribilof Islands, Bering Sea to Unalaska.

Colus halidonus Dall, 1919

Plate 13, fig. 12

Proceedings of the United States National Museum, **56**:318.

Shell of moderate size, short, stout, white with an olivaceous periostracum, with about six whorls, the apex defective, suture distinct, not appressed; axial sculpture of (on the penultimate whorl, about 16) fine channeled grooves with wider flat interspaces, of which two behind the suture are wider than the others; on the base the posterior edge of these interspaces is raised and the anterior lowered to the level of the bottom of the grooves giving the effect of narrow threads with much wider intervals; these two varieties of sculpture cover the whole of the shell; aperture wide, the outer lip somewhat reflected, body erased, pillar short, gyrate, axis pervious; canal short, very wide, recurved and flaring anteriorly; operculum normal. Height of shell, 35; of last whorl, 27; of aperture, 20; diameter, 20 mm. (Dall.)

TYPE in United States National Museum, No. 213250. Type locality, off Destruction Island, Washington, in 516 fathoms.

RANGE. Pribilof Islands, 81 fathoms to Monterey Bay, California, in 633 fathoms.

SECTION LIMATOFUSUS Dall, 1918

Colus trophius Dall, 1919

Plate 13, fig. 10; Plate 7, fig. 3

Proceedings of the United States National Museum, **56**:319. *Bulletin 112,* United States National Museum; Pl. 10, fig. 9.

Shell of moderate size, short, white, with a pale olivaceous periostracum with more than five well-rounded whorls, the apex eroded; suture distinct, not appressed; axial sculpture of faint concavely arcuate incremental lines; spiral sculpture of (on the penultimate whorl, about a dozen) sharp, narrow, channeled grooves, with considerably wider flat interspaces, which, on the last whorl, are more or less divided by a shallow median groove; this sculpture is practically uniform over the whole surface; aperture wide, simple, white within; outer lip slightly reflected, thin, body erased; pillar short, straight; axis pervious. Height of shell, 32; of last whorl, 26; of aperture, 21; diameter, 19 mm. (Dall.)

TYPE in United States National Museum, No. 122628. Type locality, United States Fish Commission Station 3071, in 685 fathoms, off Sea Lion Rock, Washington.

RANGE. Eastern Bering Sea to Pribilof Islands to San Nicolas Island, in 1,100 fathoms.

Colus tahwitanus Dall, 1918

Proceedings of the United States National Museum, **54**:228.

Shell small, buccinoid, with about six whorls; nucleus eroded, suture deep, not appressed; whorls well-rounded; sculpture of fine even uniform grooves with wider flat interspaces over the whole shell; periostracum dull, olivaceous; interior white, outer lip reflected, arcuate; pillar and body erased, axis twisted, almost pervious, canal very short and strongly recurved. Height, 33; max. diam., 17 mm. (Dall.)

TYPE in United States National Museum, No. 122632. Type locality, off Tahwit Head, Washington, in 178 fathoms.

RANGE. Known only from type locality.

Colus morditus Dall, 1919

Plate 13, fig. 1

Proceedings of the United States National Museum, **56**:319.

Shell small, solid, polished, of about seven whorls, the apex decorticated, rather acute, the whorls moderately rounded, the suture distinct, not appressed; axial sculpture of feeble incremental lines, their intersections slightly punctating the grooves; spiral sculpture of numerous shallow grooves with much wider flattish interspaces over the whole surface; outer lip thin, sharp, arcuate; inner lip erased, pinkish, pillar white, attenuated in front; canal wide, distinct, short, slightly recurved. Height of shell, 28; of last whorl, 20; of aperture, 15; diameter, 13 mm. (Dall.)

TYPE in United States National Museum, No. 222599. Type locality, United States Fish Commission Station 4198, Gulf of Georgia.

RANGE. Known only from type locality.

Colus timetus Dall, 1919

Plate 13, fig. 2

Proceedings of the United States National Museum, **56**:318.

Shell small, thin, with a thin pale olive periostracum, and five or more whorls, the apex eroded; suture distinct, not appressed; axial sculpture none; spiral sculpture of (on the penultimate whorl, about 33) fine, regular, sharp striae with wider flat interspaces, for the most part uniform, but near the periphery tending to be wider, this sculpture covering the whole surface; aperture wide, semilunate, outer lip gently arcuate, thin, inner lip erased, white, pillar straight, attenuated in front, canal wide, deep, very short, with a well-marked siphonal fasciole. Height of shell, 30; of last whorl, 22; of aperture, 15; diameter, 16 mm. (Dall.)

TYPE in United States National Museum, No. 213337. Type locality, United States Fish Commission Station 3333, off Iliuiuk Harbor, Unalaska.

RANGE. Known only from type locality.

Colus dimidiatus Dall, 1919

Plate 8, fig. 3

Proceedings of the United States National Museum, **56**:319.

Shell small, white, with a pale olivaceous periostracum, with five or more rounded whorls (the apex defective and the specimen not quite mature) separated by a rather deep suture; spiral sculpture peculiar, consisting of numerous crenulated grooves with much wider slightly concave interspaces disposed without regularity but on the last whorl numbering over 30, the interspaces widest near the periphery; the crenulation of the grooves is probably due to incremental lines, not elsewhere especially noticeable; aperture elongate, outer lip (immature) thin, sharp; body and pillar erased, canal rather long and recurved; axis pervious; operculum thin, the nucleus apical, somewhat curved to the left. Height of shell, 16; of last whorl, 12; diameter, 8 mm. (Dall.)

TYPE in United States National Museum, No. 213338. Type locality, United States Fish Commission Station 3346, off Tillamook Bay, Oregon.

RANGE. Known only from type locality.

Colus severinus Dall, 1919

Plate 13, fig. 11

Proceedings of the United States National Museum, **56**:320.

Shell small, white, covered with a straw-colored periostracum, with about six rounded whorls, the apex eroded, the suture distinct, not appressed; axial sculpture of obscure incremental lines; spiral sculpture of slightly irregular flattish cords separated by narrower channeled grooves; on the penultimate whorl there are fifteen to seventeen of these cords; beside these the surface is profusely scored with incised, more or less oblique, sometimes divaricate grooves, which I take to be abnormal; aperture wide, outer lip convexly arcuate, slightly expanded and thickened; inner lip with a layer of white enamel, pillar short; canal very short, wide, deep, recurved; operculum normal, dark brown. Height of shell, 33; of last whorl, 25; of aperture, 17; diameter, 18 mm. (Dall.)

TYPE in United States National Museum, No. 225225. Type locality, United States Fish Commission Station 3669, Bay of Monterey, California, 278 fathoms.

RANGE. Off Pigeon Point and Monterey Bay, California, in 60–822 fathoms.

Colus pulcius Dall, 1919

Plate 9, fig. 1

Proceedings of the United States National Museum, **56**:318.

Shell of moderate size, of about six rounded whorls, the apex eroded, shell substance of a pale livid brown, covered by an olivaceous periostracum, the suture distinct and deep; axial sculpture of uniform fine silky incremental lines; spiral sculpture of uniform flattened spirals separated by narrow grooves, about twenty-seven to thirty spirals on the penultimate whorl; aperture ovate, outer lip (immature?) slightly crenulated by the external sculpture, inner lip erased, brownish, pillar white, straight; canal short, wide, deep, forming a well-marked fasciole. Height of shell, 38; of last whorl, 26; of aperture, 18; diameter, 17 mm. (Dall.)

TYPE in United States National Museum, No. 223700. Type locality, Arctic Ocean north of Bering Strait.

RANGE. Known only from type locality.

Colus halimeris Dall, 1919

Plate 8, fig. 7

Proceedings of the United States National Museum, **56**:320.

Shell small, whitish with a yellow-brown periostracum and five whorls, including a swollen subglobular nucleus, spire otherwise rather acute, the whorls moderately rounded; suture distinct, not appressed; spiral sculpture of numerous, fine, shallow, squarish grooves, separated by wider flattish interspaces, these covering the whole surface; axial sculpture of faint incremental lines; aperture ovate, outer lip thin, simple, body erased, pillar short, twisted; canal short, wide, recurved. Height of shell, 21; of last whorl, 15; of aperture, 11; diameter, 10 mm. (Dall.)

TYPE in United States National Museum, No. 207192. Type locality, United States Fish Commission Station 4248 in Eastern Passage, near Stikine River, southeast Alaska.

RANGE. British Columbia to San Diego, California, in 60–822 fathoms.

Colus trombinus Dall, 1919

Plate 8, fig. 6

Proceedings of the United States National Museum, **56**:321.

Shell small, short, rotund, with about five whorls, the apex distinct not appressed; axial sculpture of fine, regular, almost miscroscopic, in-

cremental lines crossing the outer sculpture but hardly visible except with a lens; spiral sculpture of (on the penultimate whorl, about 10; on the last whorl, about 25) narrow, almost channeled grooves, with slightly rounded broader interspaces, sometimes divided by a smaller groove, and feebler near the suture and on the canal; outer lip thin, sharp, arcuate; inner lip erased, pillar white, short, twisted; canal short, wide, distinctly recurved; operculum normal, rather short, and wide, in harmony with the aperture. Height of shell, 16; of last whorl, 14; of aperture, 11; diameter, 10 mm. (Dall.)

TYPE in United States National Museum, No. 213332. Type locality, United States Fish Commission Station 3253, Bering Sea, off Pribilof Islands.

RANGE. Pribilof Islands, Bering Sea, in 36 fathoms.

Subgenus ANOMALOSIPHO Dautzenberg and Fischer, 1912

Colus martensi Krause, 1885

Plate 28, fig. 6

Archiv für Naturgeschichte, **51**:287; Pl. 18, fig. 18.

Testa fusiformis, subcylindrica, solida, intus castanes, anfractibus 6–7, valde complanatis, dense spiraliter striatis, epidermide fuscata tectis, apertura obovata, dimidia testae inferiore, canali brevi, paulo reflexo. Long., 38; lat., 14; long. apert. +can., 19; lat. apert., 8; alt. anfr. ult., 27 mm. (Krause.)

Shell fusiform, subcylindrical, solid, within chestnut-colored, whorls six to seven. Strongly flattened, spirally closely striated covered with hairy epidermis; aperture obovate for the lower half of the shell; canal stout, slightly reflexed. (Translation.)

TYPE in Stuttgart Royal Cabinet. Type locality, Metschigne Bay, Bering Strait. (Krause.)

RANGE. Plover Bay, Bering Strait, in 20 fathoms.

Colus adonis Dall, 1919

Plate 13, fig. 8

Proceedings of the United States National Museum, **56**:316.

Shell small, bulimiform, thin, whitish with a pale-olive periostracum, with about six whorls exclusive of the (lost) nucleus, with a very nar-

rowly channeled suture and moderately rounded whorls; spiral sculpture of narrow, equal, flat threads (about three to a millimeter) with very narrow interspaces over the whole shell, though the interspaces are a little wider on the apical whorls and the spirals underrun there by thread-like axial sculpture, giving a somewhat punctate appearance under magnification; aperture elongate, rather narrow, the outer lip thickened, not reflected, with traces of liration near the inside margin; the body and pillar with a continuous layer of enamel; canal short, wide, with no siphonal fasciole. Height of shell, 37; of last whorl, 25; diameter, 15 mm. (Dall.)

TYPE in United States National Museum, No. 205212. Type locality, United States Bureau of Fisheries Station 5053, Suruga Gulf, Japan.

RANGE. Straits of Juan de Fuca to San Diego, California; northern Japan.

Colus conulus Aurivillius, 1885

Vega Expeditionens Vetenskapliga Iakttagelser, **4**: 354; Pl. 13, fig. 6.

Skal nastan jemnt koniskt, suturer grunda, vinlingar mycket plattade, nagot insankta i havarandra, med fina spiral-ribbor pä ett afstand från havarandra af 2–3 ganger ribbornas egen bredd; narmast munkanten korsas de af skarpare tillvaxtstrior. Columella visar pa ett ex. en skarp kant. Operculum paronformadt med terminal nucleus. Epidermis gulgron (2 ex.) eller olivgron (ett tredje); svalg och columella brungula, don senara med hvita band och flacker, munkanten innantill hvit och slät, ej bla med ribbor sasom hos Euthria viridula, med hvars "var. fasciata" Dunker (Moll. Jap., tab. 3, fig. 5. och 6) den visar formlikhet. (Aurivillius.)

Shell almost evenly conical, sutures shallow, whorls very flattened, somewhat sunk into each other, with fine spiral ribs at a distance from each other of two to three times the rib's own width, nearest the aperture they are crossed by sharper growth lines. Columella shows on one specimen a sharp edge. Operculum pear-shaped with terminal nucleus. Epidermis yellowish-green on two specimens and olive-green on a third specimen. Throat and columella are brownish-yellow; the latter with white lines and spots, the edge of the aperture is white and smooth, not blue with striations as *Euthria viridula* to whose var. *Fasciata* Dunker (Moll. Jap., tab. 3, fig. 5 and 6) this form shows wavy form likenesses. (Translation.)

TYPE in Zoölogy Museum, Copenhagen? Type locality not known to writer.

RANGE. Arctic Ocean north of Bering Strait; circumboreal.

Subgenus LATISIPHO Dall, 1916

Colus hypolispus Dall, 1891

Plate 15, fig. 1

Proceedings of the United States National Museum, **14**:188; **17**; Pl. 27, fig. 1, 1894.

Shell polished, brown, with rounded whorls sculptured only by a few obsolete spirals and malleations with six or seven whorls, well-rounded to a distinct suture and rather acute spire; canal very short and strongly recurved, axis almost pervious; outer lip sinuous, throat white, a well-marked callus on the pillar and body. Length of shell, 55; of aperture, 28; breadth of shell, 26 mm. (Dall.)

TYPE in United States National Museum. Type locality, U.S.S. "Albatross" Station 3254, in Bering Sea.

RANGE. Arctic Ocean to Aleutian and Shelikoff Strait, Alaska.

Colus errones Dall, 1919

Plate 9, fig. 6

Proceedings of the United States National Museum, **56**:321.

Shell of moderate size, dark reddish-brown, acute, with six rapidly increasing moderately convex whorls and a glossy subglobular smooth nucleus of about one whorl; suture distinct, not appressed; periostracum polished; axial sculpture of faint incremental lines; spiral sculpture of the early whorls of numerous fine striae, covering the whole surface with wider flat interspaces; this sculpture continues, becoming less and less evident until except under a lens the surface appears to be smooth except on the canal; aperture semilunate, outer lip thin, simple, sigmoidly arcuate; throat whitish, body with a thin callus, pillar straight, attenuated in front; canal short, wide, strongly recurved. Height of shell, 47; of last whorl, 32; of aperture, 23; diam., 22 mm. (Dall.)

TYPE in United States National Museum, No. 226227. Type locality, Bering Sea.

RANGE. Pribilof Islands, Bering Sea, to Straits of Juan de Fuca, in 308 fathoms.

Colus halli Dall, 1873

Plate 4, fig. 9

Proceedings of the California Academy of Sciences, **5**:59; Pl. 2, fig. 3.

Shell fusiform, solid and heavy, of five and a half whorls, the last much the largest; suture subcanaliculate, not deep, but very distinct;

whorls moderately convex, somewhat appressed toward the suture. Canal rather long, much recurved; aperture elongate, acute behind; inner lip much thickened, posteriorly waved. Shell covered with a yellow-brown epidermis, with very faint revolving striae, crossing the slightly evident waved lines of growth. Long., 1.7; lat., 0.8; long. apert., 0.95 in. (Dall.)

TYPE in United States National Museum. Type locality, Sanborn Harbor, Nagai.

RANGE. Nunivak Island, Bering Sea to San Diego, California, in 65–293 fathoms.

Colus jordani Dall, 1913

Plate 16, fig. 5

Proceedings of the United States National Museum, **45**:588. *Bulletin 112,* United States National Museum; Pl. 12, fig. 7.

Shell of moderate size of about seven and a half whorls, the nucleus rounded, not swollen but rather large; suture distinct, the whorls moderately rounded; surface covered with a dark orange-brown periostracum, beneath which the shell substance is white; sculpture of incremental lines, not prominent but regular and close-set, crossed by numerous flat spirals with very narrow interspaces, this sculpture covering the whole surface, the spirals being slightly narrower in front of the suture; on the periphery of the last whorl there are about two spirals with their interspaces the width of one millimeter; aperture less than half the length of the shell; canal wide, short, sharply recurved; outer lip simple, flexuous, expanded, receding behind the periphery and advancing near the suture, connected over the body with the pillar by a thin layer of white; operculum ovate, with apical nucleus, dark brown. Height of shell, 43; of last whorl, 31; of aperture, 20; max. diam., 21. (Dall.)

TYPE in United States National Museum. Type locality, Sucia Island, Gulf of Georgia, in 67 fathoms.

RANGE. Bering Sea, 70–100 fathoms; British Columbia, 67–142 fathoms; Monterey Bay, California, 633 fathoms.

Colus aphelus Dall, 1889

Plate 13, fig. 3

Proceedings of the United States National Museum, **12**:325; Pl. 6, fig. 7.

Shell small, bucciniform, six whorled, smooth, covered with a greenish-gray epidermis; nucleus minute, eroded; whorls full, well-rounded; suture distinct, not deep, nor channeled; sculpture only of faint incremental lines and a few obscure spiral traces; aperture moderate, the outer lip

thin, very slightly reflected, flexuous; body and pillar lips white, polished, without callus; pillar short, strong, recurved, obliquely truncate anteriorly, well-recurved; canal short, wide, well-defined, and recurved; throat smooth, white; axis not pervious; operculum normal. Max. long. of shell, 30; max. lat., 15 mm. (Dall.)

TYPE in United States National Museum. Type locality, Station 2839, in 414 fathoms, off Santa Barbara County, California.

RANGE. Chirikoff Island, Alaska, to San Diego, California, in 290–626 fathoms.

Colus halibrectus Dall, 1891

Plate 25, fig. 9

Proceedings of the United States National Museum, **14**:188; Pl. 29, fig. 9.

Shell much like a miniature *Chrysodomus acosmius,* with six whorls which are less flattened, weaker and finer spiral striae, a longer canal, pink color on the pillar, and more appressed suture; the lip is thickened and a little reflected and there is a thin callus on the body. Length of shell, 35; of aperture, 17; breadth of shell, 13.5 mm. (Dall.)

TYPE in United States National Museum. Type locality, U.S.S. "Albatross" Station 3330, off coast of Akutan Island, Bering Sea, in 351 fathoms.

RANGE. Southern Bering Sea, near Unalaska Island, 351–399 fathoms.

Colus clementinus Dall, 1919

Plate 8, fig. 9

Proceedings of the United States National Museum, **56**:321.

Shell small, white, with a greenish-olive periostracum, and more than five rounded whorls, the apex decorticated; suture distinct, not appressed; axial sculpture of irregularly prominent incremental lines; spiral sculpture of a few irregular interrupted spiral threads, probably accidental, and some feeble grooves near the canal; surface practically smooth, almost polished; aperture semilunate, the outer lip thin, arcuate, body with a coat of white enamel, the pillar white, short, twisted, attenuate in front; canal wide, short, slightly recurved. Height of shell, 21; of last whorl, 15; of aperture, 11; diam., 10 mm. (Dall.)

TYPE in United States National Museum, No. 208912. Type locality, United States Fish Commission Station 4405, between Santa Catalina and San Clemente Islands, in 654–704 fathoms.

RANGE. Monterey Bay to San Diego, California.

Colus dalmasius Dall, 1919

Plate 13, fig. 9

Proceedings of the United States National Museum, **56**:322.

Shell of moderate size, acute, white covered with a dark reddish-brown periostracum with a subglobular polished nucleus of about one whorl, and six subsequent well-rounded, rapidly enlarging whorls; suture distinct, not appressed; axial sculpture of feeble incremental lines; spiral sculpture of numerous flattened threads with narrow, obscurely channeled interspaces, coarser on the canal; aperture wide, outer lip thickened, arcuate, slightly expanded; body with a thin white layer of callus, pillar short, twisted; canal short, strongly recurved. Height of shell, 35; of last whorl, 25; of aperture, 18; diameter, 20 mm. (Dall.)

Type in United States National Museum, No. 122631. Type locality, United States Fish Commission Station 2862, off coast of British Columbia.

Range. Off British Columbia in 238 fathoms.

Genus **CHRYSODOMUS** Swainson, 1840

Shell large, short-fusiform, smooth or spirally sculptured, sometimes with rude axial ribbing or nodosities or varix-like sharp laminae; outer coat of the shell subtranslucent, the inner layer with a darker, usually purplish tint, the periostracum inconspicuous and dehiscent; last whorl longer than the spire, with a wide aperture, the outer lip in the adult flaring or subreflected, not thickened; pillar flexuous, smooth; labrum without callosities o rlirae; inner side of the outer lip without liration in the typical group; the canal rather long, wide, open, and flexuous. (Dall, 1919.)

Type. *Murex antiquus* Linnaeus.

Distribution. Circumpolar, Pacific and Atlantic, Europe, Asia, America. Fossil: Pliocene—Britain, Sicily; Pleistocene and Pliocene—California; Miocene—California and Oregon.

Subgenus Sulcosipho Dall, 1916

Chrysodomus tabulatus Baird, 1863

Plate 4, fig. 5; Plate 18, fig. 4

Proceedings, Zoölogical Society of London, 6. *Proceedings of the United States National Museum,* **24**; Pl. 36, fig. 9, 1902.

Shell large, fusiform; spire elevated; apex subacute; whorls eight, sharp angulated and keeled above, forming a rimmed, spiral table; surface ornamented with revolving ridges of alternating size; suture very deeply impressed; aperture pyriform; outer lip thin, smooth; inner lip incrusted;

canal long, narrow, curved backward; columella twisted, spirally ridged. Length, 116; diameter, 46 mm. (Baird.)

TYPE in British Museum. Type locality, Puget Sound.

RANGE. British Columbia to San Diego, California, 46–218 fathoms.

SECTION CHRYSODOMUS s.s.

Chrysodomus amiantus Dall, 1889

Proceedings of the United States National Museum, **12**:321; Pl. 5, fig. 10.

Shell large, thin, white, with six whorls and a small but prominent inflated subglobular nucleus; spiral sculpture of numerous close-set rounded narrow ridges, of which part are larger than the others; on the early whorls two or three of the primaries are conspicuous on the periphery, with one or two finer ones intercalated; later the peripheral spirals merge with the other primaries, as to size and prominence, and on the last whorl there are four or five intercalary threads between the primaries, the space between the latter, from center to center, averaging 2.5 mm. to each set; transverse sculpture shows only in fine, slightly irregular lines of growth; the whorls from and including the third are inflated, and the suture, though not channeled, is strongly marked; the canal is short and recurved, the siphonal fasciole indistinct; the aperture is wide, the outer lip, prominent in the middle, receding toward the suture, and the canal, smooth, not thickened, whitish internally; inner lip concave, with a thin glaze of polished callus, slightly brown-tinted; pillar twisted and the axis minutely pervious; the aperture longer than half the shell; operculum brown, moderately stout, apically pointed. Max. long. of shell, 76; max. lat., 43; long. of aperture, 45 mm. (Dall.)

TYPE in United States National Museum. Type locality, Station 2839, near Santa Barbara Islands, in 414 fathoms.

RANGE. Pribilof Islands, Bering Sea, to Monterey Bay, California.

Chrysodomus insularis Dall, 1894

Plate 25, fig. 3

Proceedings of the United States National Museum, **17**:707; Pl. 5, fig. 10.

Shell large, solid, rather thin, with about six whorls exclusive of the (decollate) nucleus; whorls full, rounded, slightly excavated in front of the appressed suture; sculpture of, on the last whorl, three sizes of flattish rounded threads, alternating regularly in size, but on the upper whorls of only two alternated sizes separated only by shallow grooves; transverse

sculpture of moderately prominent incremental lines; aperture ample, the pillar lip blotched with livid pink and white, the pillar twisted, with a solid white inner edge and strong siphonal fasciole; canal moderate, slightly recurved; outer lip slightly crenulated by the sculpture, sharp, very slightly expanded; throat smooth, pinkish; epidermis very thin and translucent, closely adherent to the surface; operculum normal, light brown. Length of shell (decollate), 100; of last whorl, 80; max. diam., 56 mm. (Dall.)

TYPE in United States National Museum, No. 107000. Type locality, Station 3489, in Bering Sea, near Pribilof Islands.

RANGE. Pribilof Islands, Bering Sea.

Chrysodomus oncodes Dall, 1907

Miscellaneous Collections, Smithsonian Institution, **50**:155. *Bulletin 112,* United States National Museum; Pl. 9, fig. 8.

Shell solid, compact, turgid, pale brown, of about six whorls; apex defective; whorls rounded, with suture inconspicuous, in front of it sloping gently, with two or three prominent spiral cords separated by wider spirally threaded interspaces; the middle of the whorls with three prominent spiral ridges, the base with ten or twelve less prominent spirals, all with wider, evenly threaded interspaces; the spiral sculpture crossed only by lines or irregularities of growth; the absence of any marked shoulder to the whorls is conspicuous; aperture semilunar; outer lip moderately thickened, not reflected; pillar and body with a moderate layer of callus; the depth of the throat, the outer lip at the margin, and the pillar tinged with purplish brown, the rest white; pillar slightly tortuous, not pervious; canal very short, wide, slightly recurved, with a moderate fasciole. Long. of shell (decollate, leaving four whorls), 104; of last whorl, 80; of aperture, 62; max. diam., 60; of aperture, 80 mm. (Dall.)

TYPE in United States National Museum, No. 111483. Type locality, Station 4804, in 229 fathoms, Okhotsk Sea.

RANGE. Petrel Bank, Bering Sea; also, the Kuril Islands, 229 fathoms.

Chrysodomus ithius Dall, 1919

Plate 25, fig. 4

Proceedings of the United States National Museum, **14**:187; **17**; Pl. 29, fig. 4, 1894.

Shell slender, acute with seven rounded whorls, distinct suture, surface sculptured only with lines of growth and a pale purple-brownish tint. Aperture moderate not flaring, canal short. Length, 70; of aperture, 32; breadth, 30 mm. (Dall.)

TYPE in United States National Museum. Type locality, U.S.S. "Albatross" Station 3202, off California coast, in 382 fathoms.

RANGE. Off Monterey, California, 204–382 fathoms.

Chrysodomus smirnius Dall, 1919

Plate 12, fig. 2

Proceedings of the United States National Museum, **56**:322.

Shell of moderate size, acute, livid purple-brown, with a semitranslucent whitish overlayer, and a thin dehiscent olivaceous periostracum; nucleus small, irregularly swollen, of about one whorl, with about five subsequent whorls; the earlier two or three whorls have four or five low, wide, flat spiral cords with obscurely channeled interspaces, these rapidly become obsolete and on the last whorl appear quite smooth except for fine, silky, incremental lines; suture distinct, somewhat appressed; aperture wide, ovate, angular behind, the outer lip expanded, white, the throat dark brown, the body with a thin glaze which extends to the pillar, which is twisted and attenuated; the canal short, wide, somewhat recurved; operculum normal. Height of shell, 50; of last whorl, 39; of aperture, 30; max. diam., 26 mm. (Dall.)

TYPE in United States National Museum, No. 130418. Type locality, United States Fish Commission Station 3461, in Straits of Juan de Fuca.

RANGE. Nunivak Island to Straits of Juan de Fuca.

Chrysodomus nuceus Dall, 1919

Plate 12, fig. 3

Proceedings of the United States National Museum, **56**: 322; **66**: Pl. 4, fig. 3.

Shell small for the genus, solid, yellowish, rather acute, with six whorls exclusive of the (lost) nucleus, suture distinct, narrow, deep; spiral whorls flattish behind the periphery at which there is an obscure angle; in front of this are a few obscure spirals, indicated by color rather than elevation in the type-specimen; incremental lines inconspicuous rather rude; aperture white, outer lip sharp, slightly expanded; body and pillar with a thick white enamel; canal short, recurved, with a strong fasciole. Height of shell, 62; of last whorl, 50; diameter, 35 mm. (Dall.)

TYPE in United States National Museum, No. 151429. Type locality, Cook's Inlet, Alaska.

RANGE. Arctic Ocean to Cook's Inlet, Alaska.

Chrysodomus phoeniceus Dall, 1891

Plate 25, fig. 1

Proceedings of the United States National Museum, **14**:187; **17**; Pl. 29, fig. 1, 1894.

Shell resembling a small, delicately sculptured, round-whorled *C. liratus.* Whorls seven, upper ones with four or five strong cinguli, later ones with numerous fine intercalary threads between the primaries of which there are about twenty on the last whorl, color purplish-brown; sculpture feeble, with a smooth band next the suture; there are no transverse ribs; the epidermis is elevated in thin serrate lamellae in harmony with the lines of growth. Length of shell, 56; breadth, 30; length of aperture, 30 mm. (Dall.)

TYPE in United States National Museum. Type locality, U.S.S. "Albatross" Station 2862, off coast of British Columbia.

RANGE. Behm Canal, Alaska, to Cascade Head, Oregon.

Chrysodomus borealis Philippi, 1850

Abbildungen und Beschreibungen neue oder wenig gekannte Conchylien, **3**: 118; Pl. 5, fig. 2.

Testa ovata, fusiformi, cornea, striis incrementi confertissimis capillaribus sculpta; anfractibus medio angulatis, in angulo nodosis; apertura ovata, intus laevi; cauda brevi recurva. Alt., 28‴; diam., 17‴. (Philippi.)

Shell ovate, fusiform, horny, sculptured with very close capillary striae of growth. Whorls angulated in the middle, aperture ovate in angle of the nodes?, within smooth with short recurved canal. (Translation.)

TYPE in? Type locality, Arctic.

RANGE. Arctic Ocean, Aleutian Islands, and Shumagin Islands, Alaska.

Chrysodomus pribiloffensis Dall, 1919

Plate 21, fig. 4

Proceedings of the United States National Museum, **56**: 323.

Female shell rather thin, inflated, short-spired, with about six whorls exclusive of the (lost) nucleus; the suture distinct with a flattish or slightly excavated space on the whorl in front of it, beyond which the whorl is evenly rounded; the color is a warm buff, increasing to orange on the enamel of the pillar; axial sculpture of fairly obvious, fine incremental lines; spiral sculpture of a strong cord at the shoulder, two on the apical whorl, three on the penultimate whorl, eight or ten on the last whorl, of which that at the shoulder is strongest; between these cords are three to five flattish, less elevated close-set threads, except on the canal,

where the spirals are wider, flatter, and more or less obsolete; aperture broad, outer lip thin, sharp, body and pillar with a layer of enamel, the pillar short, strongly twisted; the canal wide, ovate with apical nucleus bent to the left. Height of shell, 94; of last whorl, 77; diameter, 60 mm. (Dall.)

TYPE in United States National Museum, No. 225603. Type locality, off Pribilof Islands, Bering Sea, in 50–100 fathoms.

RANGE. Pribilof Islands to Kodiak Island, Alaska, and the Queen Charlotte Islands, British Columbia.

Chrysodomus vinosus Dall, 1919

Plate 22, fig. 3

Proceedings of the United States National Museum, **56**:323.

Shell thin, with acute spire, of a pinkish flesh-color intensified to vinose near the apex, the nucleus bulbose, swollen, of one whorl with five subsequent rapidly increasing whorls; suture distinct, deep, very narrow, the whorl in front of it flattish or slightly concave to a prominent darker stronger cord at the shoulder, which on the apical whorls is peripheral; the suture is laid against a weaker cord, the remainder of the surface, obsoletely minutely spirally striated; axial sculpture of rather regular, silky, incremental lines; aperture wide, the outer lip sharp, body and pillar with a thin layer of enamel; the pillar twisted, the axis pervious, the canal wide and strongly recurved, but showing no fasciole. Operculum black with apical nucleus. Height of shell, 90; of last whorl, 70; diameter, 49 mm. (Dall.)

TYPE in United States National Museum, No. 225608. Type locality, western Bering Sea and Avacha Bay, Kamchatka.

RANGE. Western Bering Sea and Avacha Bay, Kamchatka.

Chrysodomus saturus Martyn

Plate 27, figs. 1, 2

Figures of Nondescript Shells, Table 2, fig. 47. *Universal Conchology.*

Shell large, heavy, with about six whorls; whorls shouldered, more strongly on the earlier ones. Aperture more than half the length of the shell; canal short and slightly curved. Surface with very strong lines of growth, which bundle into obscure ridges. On the shoulder angle are seen obscure and irregular knobs, more strongly developed on the body whorl and the preceding one.

TYPE in Dr. Hunter Collection, British Museum. Type locality, King Georges Sound, Hudson Strait, Labrador.

RANGE. Arctic Ocean from Point Barrow to Bering Strait; Plover Bay, south and east to Cape Douglas, Alaska.

Described as *Buccinum saturum.*

Chrysodomus saturus beringianus Middendorff, 1847

Bulletin, Academy of St. Petersburg, 7: No. 16.

Testa flavicante, strato, externo calcareo, solida, crassa, ovato-fusiformi; anfractibus parum convexis, transversim plicatis, plicis in quoque anfracta 9 ad 11; plicarum interstitiis canaliculis obsoletioribus 4 ad 6 transvertis exaratis; columella recta longiuscula; labio modice-calloso; labro simplici; apertura albescente, vernicosa, ad plicas externas late-canalicula; canali recto. (Middendorff.)

Eskommt diese Art im Allgemeinen der Gestaltverhältnisse dem *Trit. norvegicum* am nachsten, hat aber dabei nahe dieselbe Spindelbildung wie *Trit. antiquum;* von beiden wird es aber leicht durch Querfaltungen unterschieden. (Middendorff.)

Shell yellowish, with external calcareous layer, solid, thick, ovately fusiform; whorls little convex, transversely plicate; plications on each whorl nine to eleven, with four to six transverse interstitial channels somewhat obsoletely trenched; with straight longish columella; lip moderately callous; lip simple; aperture whitish, vernicose, broadly canaliculate at the external plications; with straight canal. This species in general in its form comes nearest to *T. norvegicum,* has, however, nearly the same spindle ornamentation as *T. antiquum,* from both of which it is easily distinguished by its transverse folds. (Translation.)

TYPE in Academy, St. Petersburg. Type locality, Bering Sea.

RANGE. Plover Bay, near Bering Sea.

Chrysodomus saturus elatior Middendorff, 1848

Sibirische Reise, 225; Pl. 10, fig. 3.

Nur ein einziges Exemplar gehörte dieser forma A′ an; es stimmte im Übrigen ganz mit der zur forma A gehörigen überein, bis auf die aus den Maassen deutlich sich ergebenden Unterschiede: 1) das mehr hervorgezogene Gewinde, (geringerer Ang. apicalis); 2) der weniger gekrümmte Kanal (geringere Ang. canal.); 3) die flacher und allmäliger zur Aussenseite der Spindel ausläufende letzte Windung (längere Colum. ext.). Diese forma *elatior* A′ ist es welche auf beifolgender Taf. X abgebildet, wahrend die forma *normalis* des *Trit. antiquum* var. *beringiana* auf Taf. II, figs. 3, 4, und Taf. V, fig. 1, meiner "Beitrage" Platz gefunden.

Unter mehreren aus Kamtschatka herstammenden Schalen der var. *beringiana* besitzt das Museum eines mit ansehnlich höherer Apertur a'' (long., 90; anfract. ult. altit., 56½–⅛). Das Abgeplättete der Windungen verringert sich bei einigen Exemplaren dadurch dass sich unteralb der Mitte jeder Windung eine mehr oder minder deutliche Andeutung einer Stufe zeigt, so dass mithin die Windungen dadurch denen des *Fus. perversus* Lmk. ähnlich werden. Bei einem aus Kamtschatka herrührender Exemplare mit sehr kurzem und stark gekrümmten Kanale, das sich durch die völlige Abplattung seiner Windungen auszeichnet, ist jene Andeutung einer Stufe auf der letzten Windung dennoch nicht zu verkennen, und es läuft mit jener parallel, in einiger Entfernung unterhalb derselben, ein kaum bemerkbärer stumpfer Kiel. Diese so eben beschriebene Abanderung macht den Übergang zu einem ungewöhnlich grossen und schweren Exemplare (Totallange 120; Gew. 4) aus dem Berings-Meere, das zur forma *normalis* A gehörig ist, und in den Gestaltverhältnissen volkommen der Normalform meiner var. *beringiana* entspricht, jedoch auf der vor-vorletzten und der drittvorletzten Windung nicht nur jene Stufe deutlich aufweist, sondern auch auf jeder Windung schwache und unregelmässige Andeutungen von 6 bis 7 varicosen Hervortreibungen sehen lässt. Dieses Exemplar, das ich auf Taf. V, fig. 1 des zweiten Heftes meiner "Beitrage" habe abbilden lassen, deutet darauf hin dass es wohl möglich ist, es werde eine Lokalität entdeckt werden an der die var. *beringiana* mit gekielter Skulptur (B') auftritt. Es wäre dieses eine bedeutende Annäherung zu meiner var. *communis* und *angulato carinata* des *Trit. antiquum* L., und nur die gedrungenere Form, und der kürzere gekrümmtere Kanal gäben in solchem Falle die Mittel zur Unterscheidung ab. Gleichzeitig würden auch in dem besprochenen Falle Übergänge zu dem *Fusus bulbosus* Val. vermittelt, den ich übrigens bisher nur allein aus der textlosen Abbildung (*Voyage de la Venus; Atlas d'histoire naturelle; Mollusque,* Pl. V, figs. *2a, 2b, 2c*) kenne der aber in Bezug auf die Gestaltverhältnisse, gedrüngeneren Abänderungen meiner var. *beringiana* (vergl. Taf. II, figs. 3, 4 des IIten Heftes meiner "Beitrage") sehr nahe kommt. Long., 78; latit., 43; altit. anfr. ult., 44; latit. apert., 23; col. ext. long., 23. (Middendorf.)

Only a single specimen belonged to this form A'; it agreed in general entirely with that belonging to the form A, except as to the dimensions, which show distinct differences: 1) the more greatly produced (smaller apical angle); 2) the less bent canal (smaller angle of the canal); 3) the narrow last coil extending more gradually to the outside of the axis (larger columnar extension). This form *elatior* A' is that which was illustrated on the following Plate X, while the form *normalis* of *Trit.*

antiquum var. *beringiana* found their place on Plate II, figs. 3, 4, and Plate V, fig. 1 of my "Beitrage." Among several shells of the variety *beringiana* that came from Kamchatka the Museum possesses one with especially high aperture a'' (long., 90; last whorl, length, 56½–⅛. The flattening of the whorl decreases on some specimens in that below the middle of each whorl a more or less distinct step shows itself, so that through this the whorls become like those of *Fus. perversus* Lamarck. On one specimen from Kamchatka with very short and strongly bent canal, distinguished by the complete flattening of the whorl, the indication of the step cannot be overlooked, and there runs also and parallel with that at some distance below it, a scarcely perceptible keel. This thus-described variation gives the transition to an unusually large and thick specimen (total length, 120; whorl, 4) from Bering Sea, which belongs to the form *normalis* A, and in its dimensions corresponds perfectly to the normal form of my variety *beringiana;* however, the next before the last and the third before the last whorl not only show the step distinctly, but also show on each whorl weak and irregular indications of 6 to 7 varicose ridges. This specimen, which I here figured on Plate V, fig. 1, of the second half of my "Beitrage," indicates that it is possible that a locality might be found where the variety *beringiana* might occur with keeled sculpture B'. This would be a significant approach to my var. *communis* and *angulato carinata* of *T. antiquum* L., and in such a case only the more depressed form and slender and more greatly bent canal would give means of distinguishing them. At the same time in the case discussed, transitions to *Fusus bulbosus* Val. would be attained, which I am acquainted with up to this time only in the textless illustration (*Voyage de la Venus; Atlas d'histoire naturelle; Mollusque,* Pl. V, figs. 2*a,* 2*b,* 2*c*) but which as to the measurements comes quite near to the more depressed varieties of my var. *beringiana.* (Translation.)

TYPE in Academy, St. Petersburg. Type locality, Bering Sea.

RANGE. Norton Sound, south to Unalaska, Alaska.

Chrysodomus saturus communis Middendorff, 1848

Beitrage zu einer Malacologia Rossica, **2**:131; Pl. 5, figs. 5, 6.

Testa rufescente, medilis anfractibus omnibus angulato carinatis; anfractibus duobus aut tribus, nobis (in quoque anfractu 8 ad 10) eodem sensu magitudine auctis.

Es ist dieses nach meiner Erfahrung die häufigste Varietät, welche auch den grossten Verbreitungskreis einnimmt. Für gewöhnlich sind die Kiele und Knoten als äussere Sculptur nur undeutlich ausgesprochen,

seltner aber ziemlich ausgeragt, wonach ich folgende zwei Formveränderungen dieser Varietät unterscheide. (Middendorff.)

Shell rufescent, all the radial whorls angulately carinated; with the two or three last whorls nodose; with the carina toward the last whorl disappearing more and more, with the nodes (8 to 10 on each whorl) increasing in the same sense.

According to my experience this is the most common species, which also has the greatest distribution. Generally the keels and nodes are only indistinctly emphasized as external sculpture; more seldom, however, rather strongly developed, according to which I distinguish two changes of form of this variety. (Middendorff.)

TYPE in Academy, St. Petersburg. Type locality, Arctic.

RANGE. Point Barrow, Arctic Ocean, to Bering Sea.

Chrysodomus saturus tabularis Dall, 1919

Plate 12, fig. 6

Proceedings of the United States National Museum, **56**:323.

Shell of moderate size, very heavy and solid, the six whorls flatly tabulate in front of the suture, rude, of a grayish color, the nucleus lost; the suture distinct, not appressed; the apical whorls finely spirally closely threaded, but the rest of the shell without sculpture except rude incremental lines; aperture rounded, outer lip heavy, body and very short pillar with a thick coat of enamel; canal short, very narrow and deep, recurved, with wide umbilical cavity between a very prominent fasciole and the enamel of the pillar. Height of shell, 62; of last whorl, 50; diameter, 44 mm. (Dall.)

TYPE in United States National Museum, No. 31350. Type locality, Bering Sea, near Nunivak Island.

RANGE. Pribilof and Nunivak Island, Bering Sea.

Chrysodomus solutus Hermann, 1781

Der Naturforscher, **16**:53; Pl. 2, figs. 3, 4.

Testa ovata, varicibus ventris longitudinalibus inaequaliter distantibus, labio canaliculo subsoluto. (Hermann.)

Shell ovate, with ventral longitudinal varices unequally distant, inner lip with small canal somewhat free. (Translation.)

TYPE in? Type locality, Arctic.

RANGE. Mackenzie River delta west to Point Barrow and south to Bristol Bay, Bering Sea.

Chrysodomus liratus Martyn, 1784

Plate 11, figs 1, 3; Plate 20, figs. 1–4

Figures of Nondescript Shells; Table 2, Pl. 43.

Shell light brown, encircled on the body whorl by nine to fifteen revolving ribs, which are not flattened on the top, usually three of these ribs are visible on the spire whorls. (Tryon, *Manual of Conchology.*)

Shell with posterior part of whorl rounded, making a smaller angle with the suture; often with more or less strong ribs above the first prominent rib. Ribs slender, more equal, less elevated, not flattened on top; interspaces not channeled, strongly grooved, often with quite prominent intercalated ribs. Aperture purple or livid; if partly white, the white is in the channels corresponding to the ribs, with the interspaces purple. Siphonal fasciole long and slender, usually nearly obsolete, sometimes quite so. Canal curved more or less strongly to the left of the aperture. Outer margin lighter than the throat. (Dall.) Length, 75–150 mm. (Oldroyd.)

Not known to the writer where the type is. Type locality, K. Georges Sound. (Puget Sound?)

RANGE. Icy Cape, Arctic Ocean, to Puget Sound, and off Point Pinos, California, in 958 fathoms; also Japan.

Genus **SEARLESIA** Harmer, 1915

Nucleus (of *S. dirus*) smooth, of the laxly coiled smooth whorls changing abruptly into adult sculpture of a few strong axial ribs crossed by numerous spiral threads. The shell-structure subtranslucent, dark-colored; the shell short-fusiform, periostracum inconspicuous; aperture shorter than the spire, the outer lip thickened and internally lirate; the body callous, with a narrow chink between the reflected enamel and the strong siphonal fasciole; canal short, open, slightly recurved. (Dall.)

TYPE. *Trophon costifer* S. Wood, Crag of Britain.

DISTRIBUTION. West America, Japan.

Searlesia dira Reeve, 1846

Conchologia Iconica, Buccinum, fig. 92. United States National Museum, *Bulletin 112;* Pl. 8, fig. 1.

Buc. testa fusiformi, basi leviter recurva, anfractibus rotundatis, striis regosis conspicuis elevatis undique cingulatis, aperturae fauce sulcata; intus extusque soride fusca. (Reeve.)

Shell fusiform, slightly recurved at the base, whorls rounded, encircled throughout with conspicuous elevated rough striae, interior of the aperture grooved; dull brown within and without. (Reeve.)

Length, 1.52–1.75 in. (Tryon, *Manual of Conchology.*)

Type in Museum Cuming. Type locality not known to the writer.

Range. Chirikoff Island, Alaska, to Monterey, California. Fossil: Pleistocene of Santa Barbara, California.

Described as *Buccinum dirum.*

Family BUCCINIDAE

Genus **BUCCINUM** Linnaeus, 1758

Shell few-whorled; whorls ventricose; aperture large; canal very short, reflected; operculum lamellar, nucleus external. (Woodward, *Manual of the Mollusca.*)

Type. *Buccinum undatum* Linnaeus.

Distribution. Northern and Antarctic seas, low water to 100 fathoms. Fossil: Miocene-Pliocene.

Buccinum glaciale Linnaeus, 1761

Fauna Suecica, 2d edition, 523. Tryon, *Manual of Conchology,* **3**; Pl. 76, fig. 345.

Testa laevisubstriata ovato-oblonga, anfractu infimo subcarinato. Testa crassa, magnitudine extimo articuli pollicis, pallida, secundum anfractus obsolete striare, acuminata, superne conica. Anfractibus infimus f. maximus subcarinatus est, sed haec carina in reliquis superioribus anfractibus evanescit, cum sutura anfractuum, evadat, que attenuata. Basis gibba, emarginata. Apertura ovata. Labium exterius crassum, patulum, striis incumbentibus. (Linnaeus.)

Shell subulately ovate, sutures of the spire deep, whorls somewhat flattened, longitudinally obliquely plicated, transversely two- to three-keeled, interstices between the keels regularly elevately striated; aperture short, lip conspicuously effused; dull yellowish-brown, lip white. (*Conchologia Iconica.*)

The living shell reaches a notably larger size in the North Pacific than in the North Atlantic, and the vicinity of Behring's Straits may be considered the metropolis of the species. (Tryon, *Manual of Conchology.*)

Type in Linnean Society. Type locality, Northern Sea.

Range. Arctic Ocean to Straits of Juan de Fuca; circumboreal.

Buccinum glaciale parallelum Dall, 1919

Proceedings of the United States National Museum, **54**:231.

This variety of *B. glaciale* seems confined to the Bering Sea region and many specimens reach a length of 80–85 mm., while I have one 95 mm. in length from Atka Island, Aleutian. Mr. Hirase, however, has reached the other extreme by sending a specimen, quite mature and characteristic, which is probably a male and measures only 26 mm. long. It is from Iteruo Island of the Kuril group. Both the names previously given to this variety were preoccupied for other species. (Dall.)

TYPE in United States National Museum. Type locality, Bering Sea.

RANGE. Pribilof and Aleutian Islands to Cook's Inlet; also Kuril Islands.

Buccinum plectrum Stimpson, 1865

Plate 5, fig. 5

Canadian Naturalist and Journal of Science, 374, 1865. *Conchylien Cabinet,* 2d edition; Pl. 91, fig. 2, 1883.

Shell rather large and thin, elongated; spire produced; sutures less deep than in *B. tenue;* whorls seven or eight, regularly convex, or slightly appressed, less gibbous or shouldered at the sutures than in *B. tenue,* and not carinated. Longitudinal folds very numerous, about nineteen, as broad as their interspaces, and most prominent near the suture; they are curved in a somewhat sigmoid form, and are sometimes, though rarely, interrupted, or have an intervening fold about the middle of the whorl. The striation of the surface has considerable resemblance to that of *B. glaciale,* the primary grooves being deep cut, with the intervening ridges depressed. But the grooving is far less regular than in that species; the primary grooves are more crowded near the suture, and the ridges less flattened. The secondary grooves on the surface of the primary ridges, are usually as fine as in *B. glaciale,* but often one or more of them becomes deeper, making the sculpture resemble more that of *angulosum.* Aperture oval, less than one-half the length of the shell, and narrower than in *B. tenue.* The columella does not project beyond the level of the anterior part of the outer lip, but rather falls short. The columella shows the usual three folds, but the middle fold being nearly longitudinal and parallel to the lowermost fold, the latter cannot be seen in a front view, but it is easily seen in an edge view of the columella (in broken specimens of the shell) separated from the marginal middle fold by a longitudinal sulcus. The first and second (uppermost

and middle) folds are separated by a broad deep sinus. Periostraca thin, smooth, not ciliated. Length, 2.23; breadth, 1.2 in. (Stimpson.)

TYPE in? Type locality not known to writer.

RANGE. Point Barrow, Arctic Ocean, south to Puget Sound; circumboreal.

Buccinum eugrammatum Dall, 1907

Plate 14, fig. 1

Miscellaneous Collections, Smithsonian Institution, **50**:153.

Shell acute conic, thin, of a subtranslucent brownish consistency (like *B. castaneum* Dall), with about seven turreted whorls; nucleus smooth, of two whorls; suture distinct, with wide channel in front of it, due to the first spiral rib; axial sculpture of faint incremental lines; surface with an extremely thin, smooth, dehiscent periostracum; spiral sculpture between the sutures of five or six strong, squarish, prominent, spiral ribs, with slightly narrower channeled interspaces, of which there may be from seven to ten on the last whorl; the posterior rib in many cases is nodulous or beaded, corresponding to little waves which at intervals may cross the sutural channel but do not seem ever to extend beyond the second rib; aperture semilunar, throat and body yellow, pillar and outer lip white; outer lip thickened, expanded, somewhat reflected, undulated by the ends of the ribs; a glaze of callus on the body; pillar straight, not pervious; canal wide, deep, recurved, forming a strong fasciole; operculum small, rounded-triangular, the nucleus near the narrower end. Long. of type specimen, 54; of last whorl, 40; of aperture, 28; max. diam., 31 mm. (Dall.)

TYPE in United States National Museum, No. 110539. Type locality, Station 4777, Petrel Bank, Bering Sea.

RANGE. Petrel Bank, Bering Sea, in 42–54 fathoms.

Buccinum tenue Gray, 1839

Beechey's *Voyage to the Pacific, etc., Zoölogy,* 128; Pl. 36. fig. 19.

Shell ovate, conical, thin, pellucid, pale brown, very finely and closely spirally striated, and closely longitudinally plaited, the plaits arched regular. The spire acute; the whorls rounded. The outer coat of this shell is very thin and powdery, and appears to separate very easily, for in most specimens there are large spaces in which it has entirely disappeared,

leaving a thin, pellucid, smooth shell, for the outer coat alone is striated, and in most of the shells it forms the longitudinal plaits. (Gray.)

TYPE in British Museum? Type locality, Icy Cape, Arctic.

RANGE. Arctic Ocean–Aleutian Islands and Straits of Juan de Fuca.

Buccinum tenue rhodium Dall, 1919

Plate 22, fig. 1

Proceedings of the United States National Museum, **56**:324.

Shell large, rude, with much emphasized more or less broken irregular ribs and a conspicuous reddish-brown periostracum, with more than seven whorls, a deep suture, and cream-colored enamel. Type specimen measures 89 in length, with a diameter of 40 mm. (Dall.)

TYPE in United States National Museum, No. 224069. Type locality, Plover Bay, near Bering Strait.

RANGE. Plover Bay, near Bering Strait, in 8–25 fathoms.

Buccinum tenue lyperum Dall, 1919

Plate 9, fig. 8

Proceedings of the United States National Museum, **56**:324.

Shell has a strongly constricted suture and about six rotund whorls, with the axial sculpture largely obsolete and the periostracum a very dark olive. In its other characters it agrees with the normal type of the species. Long., 52; diam., 32 mm. (Dall.)

TYPE in United States National Museum, No. 225611. Type locality, southwestern Bering Sea.

RANGE. Southwestern Bering Sea, in 100 fathoms.

Buccinum solenum Dall, 1919

Plate 12, fig. 1

Proceedings of the United States National Museum, **56**:325.

Shell of moderate size, acute, white under a dehiscent straw-colored periostracum, with a strongly constricted suture and about six slightly shouldered, somewhat rotund whorls, exclusive of the (lost) nucleus; the whorls of the spire are numerously ribbed (about 20 on the penultimate whorl), with slightly oblique riblets most emphatic on the shoulder, obsolete at the periphery and on the last whorl; the incremental lines are prominent, close, and thread-like; spiral sculpture of very minute,

closely undulated, close-set striae, which gave a somewhat granular or punctate aspect to the intervals between the axial threads; on the periphery of the last whorl are a few obsolete, stronger spirals; aperture wide with a conspicuous gutter somewhat in front of the shoulder in the outer lip; a glaze of enamel on the body and pillar, a short shallow recurved canal, and a well-marked siphonal fasciole; the operculum nearly circular, laminose externally, with central nucleus. Height of shell, 47; of last whorl, 34; diameter, 30 mm. (Dall.)

TYPE in United States National Museum, No. 222485. Type locality, United States Fish Commission Station 3518, off Nunivak Island, Bering Sea.

RANGE. Bering Sea, Nunivak Island, to north of Unimak Island, in 36 fathoms.

Buccinum humphreysianum Bennett, 1825

Zoölogical Journal, 1:398. Jeffreys, *British Conchology;* Pl. 88, fig. 1.

Shell ovate-conical, thin, horn-colored, with numerous transverse striae; the last whorl with three double bands (the upper one nearly obsolete) which are brown, irregularly spotted with white; columella smooth; margin of the labrum slightly reflected. Whorls eight, convex, finely and closely striated in a transverse direction; striae slightly waved, and crossed by very minute longitudinal lines. Bands on the lower whorl six, narrow, disposed in pairs, brown, irregularly spotted with white, gradually disappearing on the upper ones. Columella smooth, white; aperture horn-colored; lip white, slightly thickened and reflected at the margin. Canal very short, with a slight tinge of violet behind it. Length 2; breadth, 1 mm. (Bennett.)

TYPE in British Museum? Type locality, harbor of Cork.

RANGE. "Northwest America" (Pease); exotic?

Buccinum oedematum Dall, 1907

Plate 14, fig. 2

Miscellaneous Collections, Smithsonian Institution, 50:145.

Shell rather thin, swollen, short-conic, with a greenish-gray periostracum, which is smooth and caducous, whorls about seven, usually more or less eroded, with a chalky-white substratum; sculpture of (on the penultimate whorl, about 40) narrow, sharpish, sigmoid wrinkles, with wider interspaces, obsolete on the base, sparser on the last whorl, and more or less irregular, the whole surface finely, evenly, spirally striated; suture distinct, not deep; aperture milk-white, wide, ample, the outer lip

deeply flexuous behind, slightly thickened, and reflected; body with a wash of glossy white callus; pillar very short, obliquely truncate, moderately callous; canal wide, very short, sharply recurved, with a well-marked fasciole. Long. of shell, 60; of last whorl, 40; of aperture, 29; max. diameter, 35 mm. (Dall.)

TYPE in United States National Museum, No. 107016. Type locality, Station 3502, near the Pribilof Islands, in 368 fathoms.

RANGE. Pribilof and Sannak Islands to Tahwit Head, Washington.

Buccinum polare Gray, 1839

Beechey's *Voyage to the Pacific, etc., Zoölogy,* 123. *Conchylien Cabinet,* 2d edition; Pl. 9, fig. 4, 1883.

Shell ovate, conical, rather ventricose, thin white; whorls ventricose, closely transversely plaited, and deeply and closely spirally striated, the upper one with a subposterior, and the last with three or more elevated keels. Mouth ovate, inner lip much absorbed; canal only slightly recurved. (Gray.)

This shell is very like *B. glaciale* in form, but the whorls are deeply striated and closely plaited. The shells of this kind appear to be formed of two coats, an opaque dead-white external one, and a hard pellucid-white inner one; the outer one is often eroded, from the apex of the Polar species leaving the under one exposed, which being smooth, polished, and without striae give the tips of the shell quite a different appearance from the rest. In one specimen the last whorl has three equidistant keels—in the other the hinder keel is prominent, and there are three close, slight keels in front. There was a fragment of a shell brought from the same place with the former, which is deeply spirally striated, longitudinally plaited, and slightly keeled like the former, but it is rather more solid, more deeply striated, and the whorl has an extra strong prominent keel just before the suture, which gives the shell a very different appearance. I am inclined to consider it only a variety of this species. (Gray.)

TYPE in British Museum? Type locality, Icy Cape, Arctic.

RANGE. Arctic Ocean to Bering Sea; also Alaska.

Buccinum chartium Dall, 1919

Plate 22, fig. 2

Proceedings of the United States National Museum, **56**:325.

Shell of medium size, white, with a very pale olive-gray, thin, dehiscent periostracum, with about eight gradually increasing whorls (the nucleus defective) separated by a well-marked suture; spiral sculpture of three

rather prominent subequal cords, one at the shoulder, one at the periphery, and one midway between the others, the interspaces equal, wider and carrying two or three intercalary alternating threads; on the last whorl in the type specimen, in front of the periphery, are about 20, subequal and equally spaced, flattish threads with narrower very shallow interspaces; the canal has no spiral sculpture; axial sculpture of fine vertical threads with wider interspaces; aperture more or less sinuous behind; canal short, wide, recurved with a feeble fasciole; operculum small, smooth, concave, with nucleus somewhat to the left of the center. Height of shell, 60; of last whorl, 32; diameter, 44 mm. (Dall.)

TYPE in United States National Museum, No. 226270. Type locality, United States Bureau of Fisheries Station 3709, off Honshu Island, Japan Sea, in 260 fathoms.

RANGE. Pribilof Islands, in 688 fathoms; also Japan.

Buccinum pemphigus Dall, 1907

Plate 24, fig. 2

Miscellaneous Collections, Smithsonian Institution, **50**:151.

Shell large, thin, swollen, pale olivaceous, with a smooth periostracum over a white chalky layer underlaid by a flesh-colored substratum with about seven whorls; suture appressed, the surface of the whorl sloping rapidly away in front of it to a small sharp carina which marks the shoulder of the whorl, beyond which the whorl is globosely rounded; there is no axial sculpture except incremental lines; the spiral sculpture consists of low, flattish threads, more or less alternated in size, a few between the shoulder and periphery somewhat more prominent than the rest, but not elevated, having wide striated interspaces, while those in front of the periphery are smaller, closer, and pretty regularly alternated in three sizes; aperture wide, white, the body pinkish, the anterior end of the pillar suffused with yellow; outer lip thin, slightly expanded and flexuous; body with a glaze over the pink substratum; pillar straight, its edge gyrate, completely pervious; canal short, wide, recurved, with a faint fasciole; operculum thin, yellowish, with the nucleus sublateral in the posterior third. Long. of shell, 63; of last whorl, 48; of aperture, 37; max. diam., 37 mm. (Dall.)

TYPE in United States National Museum, No. 110537. Type locality, Station 4797, off Dalnoi Point, Kamchatka, in 682 fathoms.

RANGE. Western Bering Sea.

Buccinum pemphigus major Dall, 1919

Proceedings of the United States National Museum, **56**:325.

Male shell, large, thin, inflated, white, with an adherent olivaceous periostracum, with seven whorls exclusive of the minute (eroded) nucleus; suture distinct, spiral sculpture of a low narrow keel at the shoulder and numerous flattish, close-set, usually paired or duplex threads, uniformly covering the whole surface; incremental lines inconspicuous; aperture wide, white, the outer lip thin, narrowly reflected; body and pillar with a glaze of enamel; pillar short, straight; canal wide, short, somewhat recurved, with a moderate fasciole; operculum large, rounded triangular with subcentral nucleus. Height of shell, 86; of last whorl, 64; of aperture, 50; diameter, 55 mm. (Dall.)

TYPE in United States National Museum, No. 225248. Type locality, United States Fish Commission Station 3643, western Bering Sea.

RANGE. Western Bering Sea and south to Japan.

Buccinum pemphigus orotundum Dall, 1907

Plate 14, fig. 8

Miscellaneous Collections, Smithsonian Institution, **50**:152. *Bulletin 112,* United States National Museum; Pl. 12, fig. 9.

Shell acute, short, very wide, of a creamy or pinkish white, covered with a thin dehiscent periostracum, having about six whorls; suture distinct, appressed, with a few small irregular axial plications in front of it, especially on the apical whorls; spiral sculpture of low, fine, sharp, subequal threads, of which a few, especially near the canal, are more prominent, having three or four less prominent ones between them; the interspaces are, as a rule, wider, and are reticulated by incremental lines; aperture wide patulous, yellowish within; outer lip thin, sharp, expanded, flexuous behind, slightly thickened within; body white, glossy; pillar white, arcuate, with a thin layer of callus; canal wide, deep, recurved, forming a conspicuous fasciole with a wide channel behind it; operculum large, brown, with a subcentral nucleus. Long. of shell, 60; of last whorl, 50; of aperture, 39; max. diam., 40 mm. (Dall.)

TYPE in United States National Museum, No. 110538. Type locality, Station 3254, north of Unimak Island, Bering Sea.

RANGE. Nunivak Island, Pribilof, and Unimak Islands, Bering Sea.

Buccinum viridum Dall, 1889

Proceedings of the United States National Museum, **12**:320; Pl. 6, fig. 9.

Shell delicate, thin, inflated, six-whorled, with a delicate greenish gray, slightly fringed, dehiscent epidermis; spiral sculpture of numerous subequal flattish threads, with narrower rounded interspaces and no intercalary threads; these threads are, as usual, slightly coarser on the base and finer behind the shoulder of the whorl near the suture; at the shoulder a single more prominent but not much larger thread slightly turriculates the spire; whorls full and rounded, especially on the base; suture distinct but not channeled; aperture wide, outer lip somewhat patulous in front, receding toward the suture; canal wide, short, hardly discriminated from the aperture, very slightly recurved; fasciole distinct but not prominent; pillar thin, twisted; inner lip smooth, white, slightly excavated, or the limy outer layer of the shell is there absorbed and the space covered with a thin wash of polished glaze; except for the epidermis the shell is pure white. The outer layer is very thin and but slightly reflected. The nucleus is eroded on the surface so that its character is not determinable. Max. long. of shell, 46; of aperture, 24; max. lat., 29 mm. (Dall.)

TYPE in United States National Museum. Type locality, Station 2839, off Santa Barbara Islands, California.

RANGE. Santa Barbara Islands, California, in 414 fathoms.

Buccinum planeticum Dall, 1919

Plate 24, fig. 1

Proceedings of the United States National Museum, **56**:326.

Female shell of moderate size, acute, with a distinct not constricted suture and seven rounded whorls exclusive of the (lost) nucleus; shell of a warm buff color, the thin periostracum dehiscent; axial sculpture of on the upper whorls, about a dozen low obscure ribs only apparent behind the periphery and absent on the last whorl; the lines of growth are hardly perceptible; spiral sculpture of very fine close threads, raised slightly into fasciculate bands of five or six threads, the interspaces more distinctly defined on the base than behind the periphery; this sculpture covers the whole shell; the aperture wide, the margin in the type-specimen deeply sulcate behind, hardly reflected, patulous in front; body erased, pillar nearly straight; canal very short, wide, sharply recurved with a feeble fasciole. Height of shell, 65; of last whorl, 45; diameter, 35. (Dall.)

TYPE in United States National Museum, No. 223098. Type locality, United States Fish Commission Station 3305, southwest of Hagmeister Island, Bering Sea.

RANGE. Pribilof Island, Bering Sea, to Queen Charlotte Islands.

Buccinum diplodetum Dall, 1907

Plate 17, fig. 6

Miscellaneous Collections, Smithsonian Institution, **50**:143. *Bulletin 112,* United States National Museum; Pl. 10, fig. 3.

Shell small, thin, whitish, with a thin olivaceous more or less fibrous periostracum and about six rapidly increasing whorls; spiral sculpture of a narrow, flat-topped, strong keel at the shoulder, frequently another at or a little beyond the periphery, and sometimes two smaller threads, between the suture and the shoulder; secondary sculpture of rather obscure flattish spiral threads with equal or narrower interspaces (but no sharp striation) covering the whole surface; suture distinct, not channeled or appressed; aperture semilunar, outer lip thin, slightly reflected; throat, body, and pillar glossy white; pillar short, straight; canal very short and wide, recurved, with an obscure fasciole; operculum well-developed, pale, with the nucleus near the middle of the outer edge. Long. of shell, 38; of last whorl, 26; of aperture, 17; max. diam., 21 mm. (Dall.)

TYPE in United States National Museum, No. 110517. Type locality, Station 3074, off Sea Lion Rock, coast of Washington.

RANGE. Off Sitka, Alaska, in 1569 fathoms, to Sea Lion Rock, Washington, 877 fathoms.

Buccinum cnismatum Dall, 1907

Plate 17, fig. 1

Miscellaneous Collections, Smithsonian Institution, **50**:143. *Bulletin 112,* United States National Museum; Pl. 10. fig. 2.

Shell small, thin, with about six whorls, rapidly increasing, whitish with a very thin adherent brown periostracum; suture narrow, deep almost channeled; spiral sculpture of three, progressively diminishing, strong, wide, ill-defined ridges, the first forming a shoulder near the periphery, the interspace between it and the next anterior roundly excavated, the second with the suture under it, the third and smallest in the middle of the base; between the suture and the shoulder the slope of the whorl is flattish; the whole surface sharply microscopically spirally striated, with

the striae and intervals more or less fasciculated; aperture subtriangular, the outer lip modified by the sculpture, slightly expanded; throat and body glossy, pillar twisted; canal short, wide, recurved, forming a well-marked fasciole. Long. of shell, 38; of last whorl, 27; of aperture, 20; max. diam., 20 mm. (Dall.)

TYPE in United States National Museum, No. 110518. Type locality, Station 3331, in Bering Sea, north of Unalaska.

RANGE. Bering Sea, north of Unalaska, in 300 fathoms.

Buccinum kadiakense Dall, 1907

Plate 19, fig. 3

Miscellaneous Collections, Smithsonian Institution, **50**:147. *Bulletin 112,* United States National Museum; Pl. 15, fig. 5.

Shell small, acute, yellowish-white, with about six sharply sculptured whorls; suture distinct, not appressed; axial sculpture of (on the last whorl of the type about twelve) oblique, rounded, wave-like ribs, with wider interspaces, evanescent beyond the periphery; also of fine, prominent incremental lines; spiral sculpture of more or less alternated, distinct rounded threads, one at the periphery slightly more conspicuous than the others; the threads on the base, as usual, stronger than the others; aperture elongate, narrow, body and pillar callus, white, a slight, oblique ridge on the pillar near its anterior edge; pillar long, straight, white; canal wide, hardly recurved. Long. of shell, 21; of last whorl, 13.5; of apert., 9; max. diam., 8.5 mm. (Dall.)

TYPE in United States National Museum, No. 110527. Type locality, Kodiak Island, Alaska.

RANGE. Kodiak Island, Alaska.

Buccinum bulimuloideum Dall, 1907

Plate 17, fig. 7

Miscellaneous Collections, Smithsonian Institution, **50**:150. *Bulletin 112,* United States National Museum; Pl. 15, fig. 2.

Shell small, very thin, with a thin periostracum of a straw-yellow color, distinct suture, subacute spire, and about six whorls; surface apparently smooth, but under the lens showing fine uniform microscopic spiral striation, but not fasciculated, but more or less undulate; aperture white, outer lip slightly expanded and thickened; a thin wash of callus on the body; pillar short, twisted, not pervious; canal short, wide, deep, forming a marked fasciole with no keel behind it; when fresh, the periostracum, rising on the incremental lines in microscopic elevated lines,

reticulates the sculpture, but this is lost with wear. Long. of shell, about 34; of last whorl, 25; of aperture, 16.5; max. diam., 15 mm. (Dall.)

TYPE in United States National Museum, No. 110534. Type locality, Station 2853, southeast of Alaska peninsula.

RANGE. Near Shumagin Islands, Alaska, in 159 fathoms.

Buccinum rondinum Dall, 1919

Plate 17, fig. 8

Proceedings of the United States National Museum, **56**:326. *Bulletin 112,* United States National Museum; Pl. 12, fig. 3.

Shell small, pale straw color, thin, with about five well-rounded whorls, the nucleus eroded; suture distinct, not appressed; axial sculpture of fine close minute incremental lines on which the periostracum rises in minute, equal lamellae; spiral sculpture of low, minute, equal threads with equal or wider interspaces, over the whole surface; aperture with the outer lip simple, arcuate, with the extreme margin slightly expanded; inner lip white, erased; pillar short, thin, twisted; canal wide, deeply excavated, hardly differentiated. Height of shell, 20; of last whorl, 16; of aperture, 11; diameter, 11 mm. (Dall.)

TYPE in United States National Museum, No. 110534a. Type locality, United States Fish Commission Station 2853, off Alaska peninsula.

RANGE. Southeastern Bering Sea, off Alaska peninsula, in 159 fathoms.

Buccinum castaneum Dall, 1877

Plate 5, fig. 7

Proceedings of the California Academy of Sciences, **7**:3. *Proceedings of the United States National Museum,* **24**; Pl. 37, fig. 7, 1902.

Shell large, clear chestnut-brown, with whorls seven in number, inflated and smooth, except for microscopic, closely crowded, revolving striae. Suture distinct, not channeled. Apex rather acute, pointed. Columella straight, with a faint fasciole. Aperture wide, rounded, more than semicircular. A slight glaze on the columella. Outer lip heavily thickened, expanded, and smooth, not projecting before the column nor waved; within livid whitish or purple. Length, 2.5; width, 1.1; length of aperture, 1; width, 0.75 in. (Dall.)

TYPE in United States National Museum. Type locality, Shumagin Islands, 20 fathoms.

RANGE. Sannak and Shumagin Islands, 20–41 fathoms.

Buccinum castaneum fluctuatum Dall, 1919

Plate 24, fig. 3

Proceedings of the United States National Museum, **56**:327.

A form without spiral cords but with (on the last whorl, about 10) somewhat irregularly arcuate coarse ribs, and larger than the original type.

TYPE in United States National Museum, No. 217152. Type locality, St. George Island, Bering Sea.

RANGE. Pribilof Islands to Unimak Pass and the Shumagin Islands, Alaska.

Buccinum castaneum incisulum Dall, 1919

Plate 9, fig. 7

Proceedings of the United States National Museum, **56**:327.

Smaller than the original type and has (on the last whorl, about 19) more numerous smaller ribs, which on the periphery are more or less broken up into nodules, and has the fine spiral striation fasiculated by the presence at irregular intervals of deeper spiral grooves. (Dall.)

TYPE in United States National Museum, No. 213159. Type locality, Unimak Pass, Aleutian Islands.

RANGE. Western Bering Sea.

Buccinum castaneum triplostephanum Dall, 1919

Plate 5, fig. 9

Proceedings of the United States National Museum, **56**:327; **24**; Pl. 37, fig. 9, 1902.

I named a variety with three very prominent spiral cords on the last whorl, var. *tricarinatum.* I find that Brugiere named a (*Nassa*) *Buccinum tricarinatum,* so I propose for this variety, the designation of *triplostephana.* (Dall.)

TYPE in United States National Museum. Type locality, Aleutian Islands.

RANGE. Kyska and Amchitka Isands, Aleutian Islands.

Buccinum picturatum Dall, 1877

Plate 5, fig. 8

Proceedings of the California Academy of Sciences, **7**:8. *Proceedings of the United States National Museum,* **24**; Pl. 37, figs. 8, 9, 1902.

Shell of moderate size, rather slender, with acute apex, sculptured with fine wavy striae, the interspaces between which are usually flat, but

occasionally rise above the general surface as flattened threads. Junior whorls with seven to nine faint, very oblique transverse costae, the prominence of which varies in different specimens. Epidermis very thin, smooth, dehiscent. Color whitish, painted with oblique reddish-brown flammules, irregularly distributed in patches transverse to the whorls. Columella twisted with a strong fasciole, lightly glazed; outer lip smooth, entire, slightly thickened, white on the edge, orange-yellow within, extending a little in advance of the columella. Apex rather acute, suture appressed; whorls seven, regularly tapering, not inflated. Length, 2.18; width, 2; length of aperture, 1.05 in. (Dall.)

TYPE in United States National Museum. Type locality, Aleutian Islands.

RANGE. Aleutian Islands, eastward to Bristol Bay and Kodiak Island, Alaska.

Figure 9 is form *tricarinatum* Dall, not described.

Buccinum ochotense Middendorff, 1848

Sibirische Reise, 235; Pl. 10, figs. 1, 2,

Testa lurida crassa, tamen leviuscula, fusiformi-conica; anfractibus subapplantis, plicis 10 vel 11, ad medium infractum maxime prominulis, transversim plicatis, longitudine confertim et aequaliter sulcato-lineatis, interstitiis sulcos latitudine ter saltem superantibus; labio calloso; labro magnopere incrassato; apertura semilunata, roseo-violacea. (Middendorff.)

Shell dull-colored, thick, nevertheless smoothish, fusiform-conical; whorls flattened, plications ten to twelve, most prominent on the middle of the whorl, transversely plicate, with length evenly sulcate-lineate, with the interstices crossing the ridges three times at least; lip greatly incrassate; aperture semilunate, roseate violet. (Translation.)

TYPE in Academy, St. Petersburg. Type locality, Arctic.

RANGE. Arctic Ocean north of Bering Strait, and the Okhotsk Sea.

Described as *Tritonium ochotense.*

Buccinum simulatum Dall, 1907

Plate 17, fig. 11

Miscellaneous Collections, Smithsonian Institution, **50**:150. *Bulletin 112,* United States National Museum; Pl. 10, fig. 4.

Shell resembling *B. limnoideum* in minor sculpture, but with six or seven obscure ribs on the penultimate whorl, hardly reaching the periphery, three strong spirals on the whorls, the last just above the suture and

the fasciculi of the spire elevated until they resemble striated threads; color pale livid-brown, without color-bands; whorls eight; outer lip thin, slightly expanded, and in front thickened with a white border; throat brownish; body and pillar glossy, not callous; canal short, wide, recurved with a strong fasciole with a groove behind it, but no keel. Long. of shell, 38; of last whorl, 25; of aperture, 17; max. diam., 17 mm. (Dall.)

TYPE in United States National Museum, No. 110533. Type locality, Station 4779, on the Petrel Bank, Bering Sea.

RANGE. Petrel Bank, Bering Sea, in 43–54 fathoms.

Buccinum sigmatopleura Dall, 1907

Plate 14, fig. 5

Miscellaneous Collections, Smithsonian Institution, **50**:144. *Bulletin 112,* United States National Museum; Pl. 12, fig. 6.

Shell subconic, narrowerly turreted, smooth, with about six whorls; spiral sculpture none; axial sculpture of, on the last whorl, about thirty low, rounded, sigmoid ribs with subequal interspaces, extending from the shoulder to the canal; suture distinct, the whorl in front of it narrowly tabulate, but the outer margin of the tabulation evenly rounded off, outer layer of the shell chalky, eroded; toward the base and aperture the layer beneath is more or less colored with purple-black, which also colors the tops of some of the ribs; aperture white, the outer lip not flexuous, white, callous, hardly reflected; body and pillar with a marked callus; pillar arcuate; canal large, deep, recurved, almost as in *Nassa,* making a strong fasciole with a sharp keel at its hinder edge. Long. of shell, 60; of last whorl, 41; of aperture, 29; max. diam., 30 mm. (Dall.)

TYPE in United States National Museum, No. 110520. Type locality, Station 4792, off Bering Island.

RANGE. Commander and Attu Island, Bering Sea.

Buccinum rossellinum Dall, 1919

Proceedings of the United States National Museum, **56**:327.

Shell small, very thin, of a dull-olive color, the suture deep, not appressed; with about six well-rounded whorls, the apex eroded; axial sculpture of fine, close, even, silky incremental lines; spiral sculpture of fine, close, equal flattish threads on the spire which later take on the aspect of rather wide flat interspaces between shallow grooves, here and there with a slightly more elevated spiral thread; aperture ovate, outer lip thin, sharp, perhaps not quite mature; inner lip white, erased, pillar short, twisted; canal very short, slightly recurved, wide, with a faint

siphonal fasciole. Height of shell, 27; of last whorl, 21; of aperture, 14; diameter, 16 mm. (Dall.)

TYPE in United States National Museum, No. 206449. Type locality, United States Fish Commission Station 3340, southeast of Chirikoff Island, Alaska.

RANGE. Southeast of Chirikoff Island, Alaska, in 695 fathoms.

Buccinum strigillatum Dall, 1891

Plate 15, fig. 7

Proceedings of the United States National Museum, **14**:186; **17**; Pl. 27, fig. 9, 1894.

Shell with seven, fully rounded whorls, deep suture, and hirsute epidermis; sculpture of numerous narrow flattened primary ridges with subequal channeled interspaces; aperture not expanded but with a wide deep sinus near the shoulder. Color white. Length, 42; breadth, 27 mm. (Dall.)

TYPE in United States National Museum. Type locality, U.S.S. "Albatross" Station 3170, off Guadelupe Island, Lower California, in 167 fathoms.

RANGE. Straits of Juan de Fuca, in 178 fathoms, to San Diego, California, in 822 fathoms, to Guadelupe Island, Lower California.

Buccinum strigillatum fucanum Dall, 1907

Plate 14, fig. 6

Miscellaneous Collections, Smithsonian Institution, **50**:152. *Bulletin 112,* United States National Museum; Pl. 12, fig. 12.

Shell small, solid, short-conic; spire acute, with a constricted suture and about seven whorls; color pale-brownish over a white chalky substratum; suture not appressed or channeled, with (on the last whorl, twenty-one) faint, narrow, low, flexuous plications in front of it, which become obsolete on the periphery; the incremental lines, though almost microscopic, are sharp, close, regular, and elevated, forming a distinct feature of the sculpture; spiral sculpture of small, flat fasciculi of four or five threads each, the fasciculi separated by deeper grooves about half the width of a fasciculus; this sculpture requires a lens to make it out and is quite uniform over the surface; aperture wide, white; outer lip expanded, reflected, and thickened, somewhat excavated behind; body with a thin white callus; pillar short, twisted, not pervious; canal wide, short recurved, forming a moderately distinct fasciole; operculum thin, the nucleus midlateral or nearly so. Long. of shell, 45; of last whorl, 34; of aperture, 23; max. diam., 27 mm. (Dall.)

TYPE in United States National Museum, No. 130426. Type locality, Station 3452 in 125 fathoms, Straits of Juan de Fuca.

RANGE. Straits of Juan de Fuca and Oregon coast.

Buccinum sericatum Hancock, 1846

Annals and Magazine of Natural History, **18**:328; Pl. 4, fig. 7.

Shell ovate, ventricose, very thin, of a pale-chestnut color, irregularly varied with paler longitudinal belts; spire not much produced; whorls six, ventricose, somewhat abruptly rounded behind, with fine spiral striae, and a few distant stronger ones crossed by minute lines of growth, giving the surface a wrinkled or shagreen appearance, visible only by the aid of a lens; body-whorl one-third longer than the spire; mouth roundish ovate, one-half longer than the spire; outer lip thin, sublobed in front; interior of a pale-chestnut or fawn color; columella smooth, pellucid, short, much and regularly arched, the bend more forward than usual; epidermis of a greenish horn-color with a delicate silky gloss when held to the light, caused by the minute cilia that clothe it, which through a lens are perceived to rise from fine longitudinal laminae; the cilia are regular and not much crowded. Length, 1; breadth, 11/16 in. (Hancock.)

TYPE in? Type locality, west coast of Davis's Strait.

RANGE. Arctic Ocean; circumboreal.

Buccinum physematum Dall, 1919

Plate 12, fig. 5

Proceedings of the United States National Museum, **56**:328.

Female shell rather large, thin, inflated, acute, whitish, whorls rapidly enlarging, about six and a half in number, the nucleus decorticated, the suture deep, not channeled; spiral sculpture of very numerous somewhat irregular, fine threads, mostly with narrower interspaces and with little or no tendency to fasciculation, an angle at the margin of the base; penultimate whorl with about sixteen, narrow, retractively arcuate ribs, extending from suture to suture with wider interspaces but obsolete on the last whorl; aperture wide, cream-colored, the outer lip thin, arcuate, reflected, the body erased, the pillar short, slightly twisted, with a wide, very short canal and moderate fasciole. Height of shell, 60; of last whorl, 47; diameter, 40 mm. (Dall.)

TYPE in United States National Museum, No. 122555. Type locality, United States Fish Commission Station 3253, in Bering Sea.

RANGE. Bernard Harbor, Arctic coast, to Point Barrow and Bristol Bay, Alaska.

Buccinum angulosum Gray, 1839

Plate 5, figs. 1, 2, 3; Plate 17, figs. 9, 10

Beechey's *Voyage to the Pacific, etc., Zoölogy,* 127; Pl. 36, fig. 6.

Shell ovate, conical, solid, white, very closely and wavedly spirally striated; upper whorls fluted, distantly and strongly plaited, the last angular, and the middle strongly plaited, like the upper whorl behind, and plain in front, the plait ending in a prominent tubercle. (Gray.)

Long., 55 mm. (Oldroyd.)

TYPE in British Museum? Type locality, Icy Cape, Arctic.

RANGE. Bernard Harbor, Arctic coast, to Point Barrow and vicinity of Bering Strait.

Buccinum angulosum normale Dall, 1885

Plate 5, fig. 6

Ray, *Polar Expedition to Point Barrow, Report,* 179; Pl. 3, fig. 1.

The normal form was obtained by the expedition on the beaches near the station and at Cape Smythe; thence to five fathoms. The fine sculpture, and especially the sharp transverse striae, always distinguish it from the other species. (Dall.)

TYPE in United States National Museum, No. 40966–7. Type locality, Cape Smythe.

RANGE. Arctic Ocean from Point Barrow to Kotzebue Sound.

Buccinum angulosum cnismatopleura Dall, 1919

Plate 12, fig. 4

Proceedings of the United States National Museum, **56**:328.

Shell thin, variable in height, the type-speciman short, acute, with five whorls exclusive of the (lost) nucleus, separated by a distinct suture; axial sculpture of (on the penultimate whorl, eleven; on the last whorl, eight) stout ribs with equal (on the spire) or wider (on the last whorl) interspaces; on the spire these extend from the suture to suture without special prominence on any one part of the whorl, but on the last whorl they are adolescent near the suture and on the base, but on the periphery are very prominent, as if pinched and pulled out, rudely and irregularly; the incremental lines are inconspicuous; the spiral sculpture is like that of the typical form, fine similar uniform striae now and then fasciculated by deeper grooving; aperture wide, outer lip flexuous, thin; body erased, pillar short, straight, canal wide, deep recurved with a strong fasciole. Height of shell, 48; of last whorl, 40; diameter, 36 mm. (Dall.)

TYPE in United States National Museum, No. 332759. Type locality, Point Barrow, Arctic coast of Alaska.

RANGE. Point Barrow, Alaska.

Buccinum angulosum transliratum Dall, 1919

Proceedings of the United States National Museum, **56**:328.

Shell of moderate size, thin, somewhat inflated, with about five whorls exclusive of the (lost) nucleus; the suture gently appressed; spiral sculpture in minor particulars like that of *B. angulosum,* but with four strong rounded cords, with much wider subequal interspaces on the last whorl and eight or more irregular feeble ribs obsolete in front of the suture also on the base; other axial sculpture of very fine hardly visible incremental lines; aperture creamy-white, the outer lip thin, hardly reflected, the body whorl glazed, the pillar slender, arcuate, short, with a deep short, rather wide canal and a strong siphonal fasciole; the periostracum thin, pale-yellowish, smooth. Height of shell, 46; of last whorl, 36; diameter, 28 mm. (Dall.)

TYPE in United States National Museum, No. 221455. Type locality, Point Belcher, Arctic coast of Alaska.

RANGE. Point Barrow to Bristol Bay.

Buccinum angulosum subcostatum Dall, 1885

Ray, *Polar Expedition to Point Barrow, Report,* 179; Pl. 3, fig. 2.

This form intergrades with typical *B. angulatum* and *B. normale.* The typical form has a distinct angle on the body whorl, and the sculpture consists of widely spaced longitudinal ribs, while in *B. normale* the sculpture consists of (in most specimens) very fine spiral lines, but in some specimens the longitudinal ribs are very faint. In *B. subcostatum* the longitudinal ribs and spiral lines are nearly obsolete. All of the forms are about the same dimensions. (Oldroyd.)

TYPE in United States National Museum. Type locality, Point Barrow, Arctic.

RANGE. Known only from type locality.

Buccinum fringillum Dall, 1877

Proceedings of the California Academy of Sciences, **7**:9. *Conchylien Cabinet,* 2d edition; Pl. 91, fig. 9, 1883.

Shell white, resembling *B. sericatum* Hancock (=*cyaneum*), on the one hand, and *B. ciliatum* Fabr., on the other. It has the dense fringed epidermis of *ciliatum* (when the shell is perfect), with the sculpture of the same, but wanting the tooth on the columella, and having a number of

sharp carinae not found in any specimen of *ciliatum* which I have seen. The form is much like that of *sericatum* Hancock, except that the whorls are inflated and shouldered, and the suture canaliculate. Whorls seven. Length, 1.36; width, .8; length of aperture, .66 in. (Dall.)

TYPE in United States National Museum. Type locality, Arctic Ocean near Icy Cape.

RANGE. North end of Nunivak Island, Bering Sea.

Buccinum tenellum Dall, 1883

See Part III, Plate 4, fig. 9

Conchylien Cabinet, 2d edition, **88**; Pl. 91, fig. 8. *Proceedings of the United States National Museum,* **24**:519; Pl. 39, fig. 9.

Shell small, solid, with about six whorls, a rather acute spire, very distinct suture, below which the whorl is pinched or puckered into short inconspicuous ribs; surface brownish-yellow with a spiral sculpture of small flat riblets separated by incised lines, the riblets themselves finely uniformly spirally striated; canal short, recurved; siphonal fasciole strong, pillar lip callous, the outer lip expanded, sinuous, not much thickened. Alt., 22.25 mm. (Dall.)

The figure in the *Conchylien Cabinet* was not accompanied by a diagnosis, which I now provide. (Dall.)

TYPE in United States National Museum, No. 108975. Type locality, Cape Etolin, north end of Nunivak Island, Bering Sea.

RANGE. Sea Horse Islands, Arctic Ocean, to Aleutian Islands.

Buccinum baeri Middendorff, 1848

Beitrage zu einer Malacologia Rossica, **2**:148; Pl. 6, figs. 7, 8.

Testa rufescente-lutea, intus vitelli coloris, levis et tenui, abbreciato-conica, spira brevi; anfractibus ultimis inflatis, supra applantis, ad longitudineum (3½) carnatis, transversim (12–) plicatis, imo subtuberculiferis; carinarum interstitiis striatis; columella recta, vix callosa; labro ad carinas nonnihil sinuato; apertura ampla, ad carinas externas sulcata, ad plicas canaliculata. Long., 39; lat., 26; alt. anfr. ult., 25; latit. apert., 13; colum. long. ext., 39 mm. (Middendorff.)

Shell rufescent yellowish, within of the color of the yolk of eggs, smooth and thin, obtusely conical; with the last whorls inflated, flattened above, carinate to length of 3½, transversely plicate (12), below subtuberculate; with the interstices of the carinae striate; columella straight, scarcely callous; with lip not at all sinuated by the carinae; with wide aperture externally sulcate by the carinae; canaliculate at the plications. (Translation.)

TYPE in Museum, St. Petersburg. Type locality, Bering Sea.
RANGE. Commander, Aleutian, and Kodiak Islands.

Buccinum baeri mörchianum Fischer, 1858

Plate 27, figs. 3, 4

Journal de Conchyliologie, **7**:299; Pl. 10, figs. 2a., 2b.

Testa acuminata, ovato-conica, concentrice rugoso-sulcata, anfractibus 5½ violaceis; apice subpapillato; anfractu ultimo ventroso, sordide griseo; sutura impressa, columella arcuata; callo tenui; peristomate simplici, semicirculari; canali brevi. Long., 26; lat., 16; apert., 17–18 mm. (Fischer.)

Test acuminata, ovately conical, concentrically rugosely sulcate; with 5½, violet colored whorls; apex subpapillate; with last whorl ventricose, dully grayish; with impressed suture, arcuate columella; thin callus; with simple semicircular periostome; short canal. (Translation.)

TYPE in? Type locality, Siberia.

RANGE. Bering Sea, Kodiak, Forrester Islands, Alaska, and Port Simpson, British Columbia; also Kurile Islands.

Buccinum fischerianum Dall, 1871

American Journal of Conchology, **7**:106; Pl. 16, fig. 13.

Epidermis smooth, thin, yellowish, marked with very fine, wavy, revolving lines, much finer than those of *Volutharpa,* and not ciliated. Surface of the whorls smooth, but marked with rather evident lines of growth, which are raised into plicate rugosities near the suture, which is appressed and not canaliculated. Whorls inflated, amply rounded, solid, porcellanous and strong. Aperture elongate-ovate; outer lip thickened, broadly, effusely arched. Periostome white. Throat of a muddy pink. Inner lip with a thin callus, thicker on the columella, where it is colored with dash of deep pink. Columella twisted, broad, arched. Canal wide and shallow, very short. Color externally yellowish-pink, upper whorls a little livid, last whorl with a few indistinct revolving brown lines, frequently interrupted. Traces of obscure, revolving ridges appear in a few places on the last whorl. This shell has precisely the form of *Volutharpa,* but its noncanaliculated suture, solid texture, coloration, and general aspect confirm me in my belief that it is a true *Buccinum.* Long., 1.3; lat., .9 inches. (Dall.)

TYPE in United States National Museum. Type locality, St. George Island, Bering Sea.

RANGE. St. George Island, Pribilof group, Bering Sea.

Buccinum tenebrosum Hancock, 1846

Annals and Magazine of Natural History, **18**:327.

Shell ovate, ventricose, very thin, glossy, of a dark obscure violet, clouded and spotted with grayish white and tawny, particularly at the sutures, where the spots are usually well-defined; whorls six or seven, much rounded, and covered with fine waved lines of growth, and a few minute, depressed spiral lines obsolete on the body-whorl; body-whorl one-third longer than the spire, with eight or nine strong, distant spiral ridges or keels, three or four of which are continued on to the third whorl; mouth as long as the spire, broadish oval, with the interior of a dark chocolate-brown extending over the columella; outer lip thin, entire; columella very dark, glossy, rather straight, with an obsolete plait or fold, which gives to it the appearance of being twice bent; the inner margin is well-raised and considerably reflected; the canal short and rather wide; epidermis very strong, of a greenish horn-color, glossy, with fine distant longitudinal laminae, bearing minute widely separated cilia. Length, 1½; breadth, nearly 1 in. (Hancock.)

Type in? Type locality, west coast of Davis's Strait.

Range. Bering Strait; circumboreal.

Buccinum ciliatum Fabricius, 1780

Fauna Grönlandica, 401. *Conchylien Cabinet,* 2d edition; Pl. 78, figs. 5, 6, 1883.

Testa turrita, patilo-subcaudata, striata, angulata, longitudinaliter ciliata, columella subplicata. Long., 5¾; lat., 3.1 in. (Fabricius.)

Test turreted, flatly subcaudate, striate, angulata, longitudinally ciliate, columella subplicate. (Translation.)

Shell similar to *B. undatum,* but thin, paper-like, and destitute of folds, except short ones near the suture, so as to give that part a crenated appearance. The whorls are more concavely rounded, so as to be nearly cylindrical; surface with minute and close revolving lines, color yellowish or livid, most specimens with blotches, or dashes of brown; epidermis fawn-colored and hispid, with short hairs, arranged for the most part along the lines of increase. Aperture short, rounded, lip very thin; throat pure white, or yellowish. The pillar has a very oblique, obscure fold. (Gould: *Report on the Invertebrates of Massachusetts.*)

Type in Copenhagen Zoölogical Museum. Type locality, Arctic.

Range. Point Barrow, Arctic Ocean, to Aleutian and Shumagins; and on the Atlantic from Greenland to the Newfoundland Banks. Fossil: Montreal.

Buccinum ovulum Dall, 1894

Proceedings of the United States National Museum, **17**:707; Pl. 30, fig. 6.

Shell small, thin, of about four and a half or five whorls; surface smooth, or with faint irregular spiral threads mostly obsolete; covered with a vernicose adherent olive-green epidermis; substance of the shell livid pinkish-purple, with a white margin to the pillar and aperture; last whorl much the largest; suture deep but not channeled; nucleus eroded in all the specimens; pillar nearly straight, thin, with a deep, very short, recurved canal; body sometimes with a thin wash of yellowish callus; operculum small, nearly circular, the nucleus subcentral, surface of attachment fan-shaped, reflected by a depression in the concave outer surface. Length of shell, 25; max. diameter, 20 mm. (Dall.)

TYPE in United States National Museum, No. 106997. Type locality, Station near Amukhta Pass, Aleutians, in 248 fathoms.

RANGE. Amukhta Pass, Aleutian Islands.

Buccinum aleuticum Dall, 1894

Plate 15, fig. 2

Proceedings of the United States National Museum, **17**:706; Pl. 27, fig. 7.

Shell thin, six whorled, covered by a thin, sparsely pilose, dehiscent epidermis; of a livid-pinkish color with a white pillar and margin to the outer lip and a dark-chestnut nucleus; sculpture of extremely fine, regular, close-set grooves, with equal or wider interspaces, regularly spaced on the last, but tending to pair on the earlier whorls; spire short, rather pointed; whorls full; suture deep, but not channeled; aperture moderate; pillar with a white callous ridge incurved upon it; siphonal distinct, bounded by a groove behind; outer lip slightly thickened, hardly reflected; throat livid brown; operculum small, subcircular with a subcentral nucleus and fan-shaped scar of attachment. Length of shell, 35; max. diam., 21 mm. (Dall.)

TYPE in United States National Museum, No. 122591. Type locality, Station 3219, south of Unimak Island, Aleutians.

RANGE. Known only from type locality.

Buccinum chishimanum Pilsbry, 1904

Nautilus, **18**:87. *Proceedings,* Philadelphia Academy of Natural Sciences, 1905; Pl. 3, fig. 20.

Shell ovate, rather thin but moderately solid, yellowish olive-green, the principal spiral ribs typically red-brown with light spots. Spire slate-blue or ashy-purple. Whorls six, the apex slightly mammillar and smooth,

the last whorl ventricose, sculptured with numerous very unequal cords and threads, the larger cords widely spaced on the upper half, more numerous below. Over all there is a microscopic sculpture of distinct, fine and close, fold-like growth-striae, and very fine, subobsolete spiral striae. The suture is bordered with weak folds, sometimes stronger and tubercular. The aperture is half-round, glossy, dark chestnut-brown inside, the bevelled and slightly expanded lip cream-white. The basal notch is rather wide and not very deep. Length, 31; diameter, 20 mm. (Dall.)

TYPE in Philadelphia Academy of Natural Sciences, No. 87757; also in Mr. Hirase's Collection, No. 1597a. Type locality, Etoro, Chishima, Kuril Island, Japan.

RANGE. Bering Island, Bering Sea; also Japan.

Buccinum taphrium Dall, 1891

Plate 25, fig. 6

Proceedings of the United States National Museum, **14**:186, **17**:707; Pl. 29, fig. 6.

Small, thin, polished brown epidermis, with fine spiral striae and conspicuous zigzag or spiral malleations; six-whorled, acute; suture deeply channeled; aperture white, with thick reflected lip and continuous thick callus on the concave pillar. Length of shell, 40; breadth, 18; length of aperture, 15 mm. (Dall.)

In the absence of the operculum and soft parts this remarkable shell can be only provisionally classified. It appears buccinoid, but differs from all true *Buccinum* by its channeled suture and prominent body callus. It may prove to be a wholly distinct genus, but for the present it seems best to refer it to *Buccinum* as a subgenus. Only a single specimen is known. (Dall, 1894.)

TYPE in United States National Museum, No. 122548. Type locality, Station 3330, in Bering Sea north of Unalaska, in 351 fathoms.

RANGE. Known only from the type locality.

Buccinum percrassum Dall, 1881

Plate 5, fig. 4

Proceedings of the United States National Museum, **9**:216. *Chonchylien Cabinet,* 2d edition; Pl. 91, fig. 5.

Shell thick, like the Arctic form figured by Dr. Kobelt from photographs of my type, but smaller and much darker in color. The operculum is disproportionately large for a *Buccinum,* nearly filling the aperture, and making a striking contrast with that of *B. mörchianum,* which is always minute and much of the time absent entirely. (Dall.)

TYPE in United States National Museum. Type locality, Bering Island.

RANGE. Arctic Ocean north of Bering Sea.

Genus **VOLUTHARPA** Fischer, 1856

Shell ventricose, thin; spire short, body-whorl and aperture very large. Operculum usually wanting; when present, at first with apical nucleus, afterward becoming annular. (Tryon, *Structural and Systematic Conchology.*)

This little group of Mollusks is confined in distribution to the North Pacific, its metropolis being Japan. Three species were described as *Bullia,* from which genus it differs in its simple foot and in possessing eyes as well as in dentition. The form and porcellaneous texture of the shell are like *Bullia,* and serve to separate it from *Buccinum.* With regard to the *Volutharpa ampullacea,* a very remarkable fact may be mentioned. The majority of the individuals are without opercula, even without a trace of the pad-like gland or area from which the operculum is secreted. About ten per cent are without, and about fifteen per cent have well-developed opercula in the proper position. The ovicapsules are not at all like those of *Buccinum,* but rather like those of *Busycon,* though smaller, consisting of disk-like capsules, united by one edge to a ribbon or stalk. (Dall.)

TYPE. *Volutharpa ampullacea* Middendorff.

RANGE. North Pacific, also Japan.

Volutharpa perryi Jay, 1855

Report of the Japan Expedition, **295**; Pl. 5, figs. 13–15.

Testa ovato globulosa, tenuicula, basim versus inflata, spira breve, acuta, suturis impressis, anfractibus laevigatis, flavido, cinerea, aperturae fauce rubiginosa. (Jay.)

Shell ovately globulose, rather thin, inflated toward the base, spire short, acute, sutures impressed, whorls smooth, color yellowish-ash, interior of aperture rusty brown.

TYPE in American Museum of Natural History, New York. Type locality, Bay of Yedo, Japan.

RANGE. St. Paul Island, Bering Sea; also Japan.

Volutharpa ampullacea Middendorff, 1848

Sibirische Reise, 237; Pl. 17, figs. 1–3.

Testa ovata, intense purpurea, spira brevissima, anfractibus convexiusculis ultimo permagno; suturis abrupte-subcanaliculatis; labio laevigato;

apertura dilatata, intus testudineo-violacea, nitida; canali brevissimo, lato, emarginato, epidermide tenue, griseo-viridi, ciliata. Long., 33; lat., 22; alt. anfr. ult., 26; lat. apert., 14; col. longit. ext., 12 mm. (Middendorff.)

Shell ovate, deep purple, very short spire, with convex whorls; of which the last is much the longest; with sutures abruptly canaliculate; with lip spread out; with aperture dilated, within tortoise shell violet, dainty; with very short canal, broad, emarginate, thin epidermis grayish-green, ciliate. (Translation.)

TYPE in Academy of St. Petersburg. Type locality, "Der Tugur-Busen und die grosse Schanter-Insel an der Sudkuste des Ochotskischen Meeres."

RANGE. Bering Strait to Straits of Juan de Fuca; also Japan.

Family COLUBRARIIDAE

Genus **ENGINA** Gray, 1839

Shell ovate-conic; spire sharp, with longitudinal nodulous ribs, decussated by revolving lines; aperture narrow, with several oblique plications in front; outer lip rather thick, inflected or callous in the middle, crenulated within. (Tryon, *Structural and Systematic Conchology.*)

TYPE?

DISTRIBUTION. Tropical: Indo-Pacific, Polynesia, Panama, West Indies; west coast of North America.

Engina carbonaria Reeve, 1846

Shell ovate, attenuated at both ends, transversely striated, longitudinally strongly ribbed, ribs distant, crossed with transverse ridges; variegated with jet black, interior of the aperture bluish-white. (Reeve.)

TYPE in Museum Cuming. Type locality

RANGE. San Pedro, California, to Panama and the Galapagos Islands.

Family ALECTRIONIDAE

Genus **ALECTRION** Montfort, 1810 (Nassa)

Spire elevated, whorls glabrous, polished or papillary; inner lip spreading; outer lip denticulate, not variced externally. (Tryon, *Structural and Systematic Conchology.*)

TYPE. *N. glans* Linn.

DISTRIBUTION. World-wide. Fossil: Eocene.

Subgenus Schizopyga Conrad, 1850

Alectrion fossatus Gould, 1849

Plate 26, figs. 1, 3, 5, 7, 9

Proceedings of the Boston Society of Natural History, 3: 152. Tryon, *Manual of Conchology,* 4; Pl. 17, fig. 316.

Shell broad-ovate, elongated, thin, livid, ash-colored, encircled throughout with raised ridges, of a deeper color, interspaces of about equal width. On the upper whorls these ridges are formed into coarse granules by longitudinal folds about equally distant, but more shallow. On the upper slope of the last whorl, in some specimens these are increased so as to become conspicuous, very oblique waves or nodules, terminating at the middle of the whorl. Spire of seven convex whorls, the last of which is ventricose, and has the usually constricted, posterior groove encircling the beak, excavated into a broad, remarkably deep canal; suture linear. Aperture broad, quadrate-ovate; lip sharp, simple, oblique posteriorly, parallel to the axis laterally and perpendicular to it at the base, thus forming an obtuse angle at the posterior third, and a right angle at its anterior limit, which is a little in advance of the point of the beak; siphonal notch broad, short, scarcely reflexed; pillar covered with a thin layer of enamel, but in general not enough to obliterate the groove and ridges, so that it appears corrugated throughout. In old specimens, the callus rises into an elevated marginal wall, with oblique folds and a canal at the angle posteriorly; interior of the aperture with sharp, raised revolving lines. Length, 1¼; breadth, 4/5 in. (Gould.)

Type in? Type locality, Puget Sound at the mouth of the Columbia River.

Range. Vancouver Island to Cerros Island, Lower California.

Alectrion californianus Conrad, 1856

Plate 26, fig. 13

Proceedings, Philadelphia Academy of Natural Sciences, 315. *Pacific Railroad, Reports,* 6; Pl. 2, fig. 1. *Bulletin 112,* United States National Museum; Pl. 11, fig. 4.

Volutions rounded, having revolving ribs and longitudinal furrows, giving the ribs a nodulous character; basal excavation profound. (Conrad.) Length, 31; breadth, 14 mm. (Oldroyd.)

Type. A fossil, New York State Museum? Type locality, Santa Clara, California.

Range. Coast of Oregon to San Ignacio Lagoon, Lower California.

Fossil: Pleistocene—San Pedro, Ventura, San Diego. Pliocene—San Pedro. Miocene—Santa Clara County, California.

Alectrion mendicus Gould, 1849

Plate 26, figs. 6, 14

Proceedings of the Boston Society of Natural History, 3:155. *Mollusca and Shells of the United States Exploring Expedition;* Pl. 19, fig. 331.

Shell small, rather light, elongated, ovate-turreted, dull brown, becoming ash-colored when dry, longitudinally undate-plicate, spirally encircled with raised threads, with equal interspaces, about seven on the penultimate whorl, the depressed portions darker than the raised. Spire elongate-conic, this form being continued nearly to the base. Whorls six or seven convex, the last a little more than half the length of the shell, ellipsoidal; constriction around the siphonal canal well-impressed; this groove broad, short, a little reflexed and somewhat contorted. Aperture small, not more than one-third the length of the shell, rounded-ovate; lip sharp and simple, having a series of about ten laminae within, not reaching the edge; pillar strongly arched, smooth, slightly invested with an ivory callus, the point projecting as far as the lip does anteriorly; fauces white, the siphonal notch tinted salmon-colored. Length, 4/5; breadth, 2/5 in. (Gould.)

TYPE in Boston Society of Natural History. Type locality, Nisqually, Port Discovery, Puget Sound.

RANGE. Kodiak Island, Alaska, to Magdalena Bay, Lower California.

Alectrion cooperi Forbes, 1850

Plate 26, fig. 8

Proceedings, Zoölogical Society of London, 273; Pl. 11, fig. 4.

N. testa lanceolata, turrita, crassa, anfractibus 6, convexiusculis, spiraliter sulcato-striatis, longitudinaliter 8 costata; costis distantibus, fortibus, distinctis; anfractu ultimo ½ longitudinis testae aequante, apertura ovata, canali brevi; labro externo crasso, simplici; labro columellari reflexo, albo; cauda alba; anfractibus fuscis, obscure albo-fasciatis. (Forbes.)

This is typically very distinct from *N. mendica* with its seven or eight distant prominent shouldered ribs, but specimens are not rare which, commencing with the numerous ribs of *N. mendica,* suppress alternate ones and increase the prominence of those remaining on the body-whorl. There are also specimens intermediate in form and number of longitudinal ribs and even some in which the ribs are obsolete on the body-whorl. As it is generally recognized as a distinct species, it may be convenient to retain its name as a variety. (Tryon, *Manual of Conchology.*)

TYPE in British Museum? Type locality, said to be Sandwich Islands, but it may have been a ballast shell.

RANGE. Puget Sound to San Diego, California.

Fossil: Miocene.

Described as *Nassa cooperi.*

Alectrion cerritensis Arnold, 1903

Paleontology of San Pedro, California, 231; Pl. 4, fig. 1.

Shell small, conical; spire elevated; apex subacute; whorls eight, slightly convex, crossed by seven to ten prominent, rounded ridges which are less prominent near the suture; spiral sculpture consists of nine to eleven sharp, raised lines; three upper whorls have a cancellate appearance; suture appressed, wavy; aperture ovate; outer lip thickened by denticulated ridge on inner side; inner lip smooth, incrusted, the incrustation completely covering the spiral sculpture internally; columella twisted, spirally sculptured, with deep groove next to body-whorl; canal short, broad, recurved. Long., 30; lat., 14.5; body-whorl, 18; aperture, 11 mm. (Arnold.)

TYPE in United States National Museum. Type locality, Upper San Pedro, series at Los Cerritos.

RANGE. Long Beach, California, to Gulf of California; also Pliocene.

Alectrion perpinguis Hinds, 1844

Plate 26, fig. 11

Zoölogy of the Voyage of H.M.S. Sulphur, **36**; Pl. 9, figs. 12, 13.

Testa elongata ovata, acuminata, lutescente, tenui; anfractibus senis rotundatis, ventricosis, cancellatis, concoloribus vel pallide fasciatis, ultimo parviusculo; columella vex callosa. (Hinds.)

Shell small, conical; spire elevated; apex subacute; whorls seven, convex, abruptly truncated at posterior margin, forming a spiral table; ornamentation consists of sharp, spiral ridges with slightly wider interspaces, and posteriorly sloping transverse ridges, the whole giving a decidedly cancellate appearance to the surface; suture deeply impressed, distinct; aperture subovate; inner portion of aperture ridged by spiral sculpture; outer lip thin; inner lip thinly incrusted; columella twisted and spirally ornamented; groove on upper part of columella prominent; canal short, curved. Length, 23; height, 12.3; body-whorl, 15; aperture, including canal, 11 mm. (Arnold.)

TYPE in Zoölogical Museum, Copenhagen. Type locality, Bay of Magdalena, Lower California.

RANGE. Puget Sound to Cerros Island, Lower California. Fossil: Pleistocene—Santa Barbara to San Diego, California. Pliocene—San Diego well, San Pedro, California. Miocene—Santa Monica and Aliso Creek, Los Angeles County, California.

Alectrion insculptus Carpenter, 1864

Plate 26, fig. 12

Proceedings of the California Academy of Sciences, **3**:223. Tryon, *Manual of Conchology,* **4**; Pl. 12, fig. 154.

N. t. satis elevata, compacta, tenuiore, elegantissima, marginibus spira subrectis; albescente, rufo-carneo varie maculata; anfr. nucl. iv. laevibus, normaliter augentibus, apice minuto, satis extante; norm. v. subrotundatis, suturis satis impressis; apertura subrotundata, canali acute reflexa; tota superficie sulculis aequidistantibus, quarum x. anfr. penult. apparent, insculpta; anfr. norm. ii. primis costulis quoque radiantibus; labio valde calloso, supra basin seu parietem expanso, haud extante, intus ruguloso. Long., 0.80; long. spir., 0.43; lat., 0.46 mm. (Carpenter.)

Shell small, conical; spire elevated; apex subacute; whorls seven, nearly flat, but obliquely truncated near margin; sculpture consists of numerous fine, spiral furrows, which are most prominent on lower portion of body-whorl; four upper whorls have prominent transverse ridges; aperture subquadrate; outer lip thickened by a slightly denticulated ridge; inner lip incrusted slightly, but spiral ornamentation shows through the incrustation; columella short and separated from body-whorl by deep, narrow groove; canal short, broad, curved. (Arnold.)

TYPE in State Collection. Type locality, Catalina Island, in 3–40 fathoms.

RANGE. Point Arena, California, to Cerros Island, Lower California. Fossil: Pleistocene, San Pedro, California.

Alectrion insculptus eupleura Dall, 1916

Proceedings of the United States National Museum, **51**:576.

In this form the axial ribs, which in the type are only indicated at the suture, are prolonged over the periphery of the last whorl to the base.

TYPE in United States National Museum, No. 209046. Type locality?

RANGE. San Simeon, California, to Cerros Island.

Alectrion tegulus Reeve, 1858

Plate 26, fig. 10

Conchologia Iconica, **8**; Pl. 15, fig. 98.

Nass. testa ovato-conica, subgibbosa, laevi, nigricante-cinerea, fascis lutescente cincta; spira breviuscula, acuta; anfractibus superne angulatis, ad angulum tuberculatis; apertura parva, columella arcuata, callositate tenui repando, labro crasse varicoso. (Reeve.)

Shell ovately conical, rather gibbous, smooth, blackish-ash, encircled with a yellowish band; spire rather short, sharp; whorls angled at the upper part, tubercled at the angle; aperture small, columella arched, with a thin spread callosity; lip thickly varicose. (Reeve.)

TYPE in Museum Cuming. Type locality, California or Lower California.

RANGE. San Francisco to San Diego, and Lower California to Panama. Fossil: Pleistocene—Santa Barbara, San Pedro, and San Diego, California.

Alectrion nodicinctus Adams, 1851

Proceedings, Zoölogical Society of London, **110.**

N. testa ovato-turrita; spira acuminata, pallida, lineis rufis transversis cincta, transversim sulcata; plicis distantibus longitudinalibus, apud suturas noduliferis ornata; labio cum callo albo laevi nitido tecta; labro extus varicoso, intus lirato. (Adams.)

N. with shell ovate-turreted; spire acuminate, pale, girdled with transverse reddish lines, transversely sulcate; ornamented with distant longitudinal plications nodular at the sutures; inner lip covered with callus, smooth and shining; outer lip varicose on the outside, within lirate. (Translation.)

TYPE in Museum Cuming. Type locality, Galapagos Islands.

RANGE. San Diego, California, to Panama and the Galapagos Islands.

Alectrion noduliferus Philippi, 1848

Zeitschrift für Malakozoologie, **136.** *Abbildungen und Beschreibungen neue oder wenig gekannte Conchylien,* Buccinum; Pl. 1, fig. 3.

B. testa subturrita, longitudinaliter plicata, transversim lirata, nodulifera, flavida, anfractibus convexis, superius linea transversa spadicea, inferius fascia caerulescente pictis; liris transversis obtusis in anfr. supp. duabus, in ultimo circa 8; apertura ovata; labro extus varice acuto intus lineis elevatis transversis 4 sculpto; labio parum dilatato, lineis elevatis obliquis 4 aspera; faucibus luteis, fasciis tribus spadiceis. Alt., 8¼; diameter, 4½‴. Patria: China borealis. Largilliert.

Anfractus 8, rotundati, ultimus antecedentibus simul sumtis paullo brevior. Plicæ longitudinales, rectae, 9–10, interstitiis dimidio angustiores, superne ad suturam evanescentes, in anfractu ultimo usque ad basim productae. Lirae transversae obtusæ, ubi plicas secant, nodulos formantes, duae in anfractibus superioribus quattuor in penultimo, secunda a tertia magis distans, prima et quarta minor. In aperturae angulo supremo plica seu linea elevata solita sed obliqua in labio ceritur, quod

parum productum, ultra labrum haud prominet. Color flavidus; pars infima a anfractum a lira secunda, vel tertia (penultimi et ultimi) inde caerulescens; lira prima anfractuum superiorum (quae secunda ultimorum) ferruginea. Differt a sequente *B. antillarum* testa magis elongata, spira longiore, anfractibus convexis, numero et dispositione lirarum, labio minore, lineisque elevatis labrorum.

Vidi in coll. cl. Largilliert.

B. with shell subturreted, longitudinally plicate, transversely lirate, noduliferous, yellowish, with convex whorls, ornamented above with a transverse brownish line, below with a bluish band; with obtuse transverse lirae on the upper two whorls, on the last about 8; aperture ovate; outer lip externally strengthened by a varix; ornamented within with four elevated transverse lines; inner lip little dilated, with four elevated oblique lines in relief; cheeks yellowish, with three brownish bands. Eight whorls rotund, the last one a little shorter in comparison with the antecedent ones. Longitudinal plications straight, nine to ten, interstices narrower in the middle, vanishing above toward the suture, extended on the last whorl to the base. Transverse lirae obtuse where they intersect the plications, forming nodules, two on the upper whorls, four on the last one, the second more distant from the third, the first and fourth small. On the upper angle of the aperture is impressed the usual elevate but oblique plication or line on the inner lip, which, little produced, scarcely extends beyond the outer lip. Color yellowish; the lower part of the whorls, from the second liration on the third (next to the last and the last) from thence bluish; the first liration of the upper whorls, (which is the second of the last ones). Differs from the following *B. antellarum,* in the more elongate shell, longer spire, convex whorls, in the number and disposition of the lirae on the inner lip, and more elevated lines of the outer lip. (Translation.)

Type in Largilliert Collection. Type locality, China borealis.

Range. San Diego, California, to the Gulf of California.

Described as *Buccinum.*

Subgenus Ilyanassa Stimpson, 1865

Alectrion obsoletus Say, 1822

Plate 26, fig. 15

Journal of the Philadelphia Academy of Natural Sciences, 2:232. Gould, *Invertebrates of Massachusetts;* Pl. 15, fig. 210.

Shell ovate-conic, subacute, cancellate, exhibiting a granulated appearance, dark reddish-brown, or blackish, sometimes tinged with oliva-

ceous; spire shorter than the body; suture not deeply impressed; beak not distinguished from the body whorl by any profound depression, and not prominent; labrum within lineated with elevated, abbreviated or interrupted lines, not incrassated, purple-black; columella at base with a prominence or fold. Length, 3/5 in. (Say.)

TYPE in Philadelphia Academy of Natural Sciences. Type locality, east coast.

RANGE. San Francisco, California; introduced from the Atlantic.

Family COLUMBELLIDAE

Genus **ANACHIS** H. and A. Adams, 1853

Shell ovately-fusiform; spire elevated, whorls longitudinally ribbed; aperture narrow; columella straight; outer lip somewhat rectilinear, crenate internally. (H. and A. Adams.)

TYPE. *Columbella rugosa* Sowerby.

DISTRIBUTION. Atlantic Coast United States, West Indies, India, China, Japan, Philippines, Australia, Polynesia, west coast of America, Galapagos Islands. Fossil: Tertiary.

Anachis penicillata Carpenter, 1865

Annals and Magazine of Natural History, series 3, **15**:398. Tryon, *Manual of Conchology,* **5**; Pl. 58, fig. 46.

A. testa parva, Metuloidea, turrita, albida, rufo-fusco plus minusve penicillata; anfr. nucleosis ii., tumidis, helicoideis, apice mamillato; norm. vi., tumidis, suturis valde impressis; costis radiantibus circ. xii., angustis, expressis; lirulis spiralibus extantibus, in spira plerumque vi. supra costas transeuntibus; apertura pyriformi, antice effusa; labro postice sinuato. Long., .21; long. spir., .13; lat., .08. (Carpenter.)

Shell small, Metuloid, turreted, yellowish, more or less marbled with chestnut; nuclear whorls two, helicoid, tumid, with mammillary apex; normal whorls six, convex, with rounded longitudinal ribs crossed by strong spiral striae; aperture pyriform, effuse below, the lip posteriorly sinuate. (Tryon, *Manual of Chonchology.*)

TYPE in British Museum. Type locality, Santa Barbara, California.

RANGE. Santa Barbara, California, to Gulf of California.

Anachis subturrita Carpenter, 1866

Proceedings of the California Academy of Sciences, **3**:223. Tryon, *Manual of Conchology,* **5**; Pl. 50, figs. 40, 41.

A. t. minuta, angusta, Rissoinoidea, pallide purpureofusca, albido maculosa; anfr. nucl. decollatis; norm. v. subplanatis, suturis distinctis; costulis

radiantibus circ. xx. angustis, vix extantibus, parum flexuosis; sculptura spirali nulla; apertura quadrata; labro acuto deorsum tumente, postice sinuato; labio conspicuo; columella torta, truncata. Long., 0.13; long. spir., 0.09; lat., 0.05 mm. (Carpenter.)

Shell narrow, subcylindrical, consisting of seven moderately convex whorls, with close oblique longitudinal ribs and revolving striae in the interstices; yellowish to chocolate-brown; aperture small, broadly oval, the lip acute and smooth within. (Tryon, *Manual of Conchology.*)

Type in British Museum. Type locality, San Diego, California, in shell washings.

Range. San Pedro to San Diego, California.

Genus **COLUMBELLA** Lamarck, 1799

Shell small, with a long narrow aperture; outer lip thickened (especially in the middle), dentated; inner lip crenulated. Operculum very small, lamellar. (Woodward, *Manual of the Mollusca.*)

Type. *Columbella mercatoria* Lamarck.

Distribution. India, Galapagos Islands, California, Atlantic coast, United States, West Indies, Mediterranean, China, Japan, Philippines, Australia, Polynesia. Fossil: Tertiary.

Columbella tuberosa Carpenter, 1865

Annals and Magazine of Natural History, series 3, **15**: 398. Tryon, *Manual of Conchology,* **5**; Pl. 50, figs. 40, 41.

A. testa *A. minori* simillima, sed vertice nucleoso tuberoso; anfr. iv., tumidis, rapide augentibus; apice minimo, margines spirae rectos parum superante, interdum subdecliviter sito; testa adulta interdum unicolore, livida seu aurantica; plerumque albida, rufo-fusco varie picta, seu maculata, seu nebulosa, seu strigata strigis radiantibus seu flexuosis, seu varie penicillata, saepe fascia tessellata subsuterali; anfract. norm. v., planatis, suturis distinctis; basi subangulata; apertura pyriformi, canali satis prolongato, arcuato; labro intus acuto, deorsum quasi tumidiore, postice sinuato, intus circ. octodentato; labio parum conspicuo, vix rugulato; columella torta, axi antice striato; superficie laevi, seu interdum minutissime sub lente radiatim striolata; epidermide cornea, tenui, subdiaphana, spirliter sub lente minutissime striolata; operculo Nassaeformi, parvo, marginibus irregulariter serratis, cicatrice bilobata. Long., .32; long. spir., .18; lat., .14 poll. (Carpenter.)

Shell smooth, whorls six, rather flat, the body-whorl having an obtusely angulated periphery; nucleus white and smooth, flat on the top, not swollen. (Tryon, *Manual of Conchology.*)

TYPE in British Museum? Type locality, Santa Barbara, California.

RANGE. Forrester Island, Alaska, to Gulf of California.

Columbella tuberosa major T. S. Oldroyd, 1924

Proceedings of the United States National Museum, **65**:24; Pl. 2, fig. 11.

Shell like the typical recent form, with the same number of whorls but uniformly much larger. Comparative measurements for specimens of eight whorls are: *C. tuberosa,* length, 8; maximum diameter, 3.8; var. *major,* length, 11; maximum diameter, 5.0 mm. (T. S. Oldroyd.)

TYPE in United States National Museum, No. 352369. Type locality, Lower San Pedro, Nob Hill cut, San Pedro.

RANGE. Banks Island, British Columbia. Fossil: From type locality, only.

Subgenus ALIA H. & A. Adams

Columbella carinata Hinds, 1844

Zoölogy of the Voyage of H. M. S. Sulphur, 39; Pl. 10, figs 15, 16.

Testa ovata, acuminata, laevigata, subtenui, fusca, spira nigricante; anfractibus subrotundatis, ultimo superne carina obtusa albida cincto, subtus coartato; labro inflexa, vix incarassato; apertura nigra. (Hinds.)

Shell smooth; fulvus encircled by two or three bands of chestnut and and white-flecked spots; base of shell and apex of spire stained with chocolate; inner margin of the outer lip frequently similarly colored. Length, 7.5–10 mm. (Tryon and Pilsbry, *Manual of Conchology.*)

TYPE locality, San Diego, California.

RANGE. San Francisco Bay to Cape San Lucas, Lower California.

Columbella carinata hindsii (Gaskoin) Reeve, 1858

Conchologia Iconica, Columbella; fig. 143.

Shell oblong-ovate, spirally striated, reddish-ash, obscurely filleted with dark spots, whorls rather swollen at the upper part; aperture somewhat square, denticulated within, effused above and below. (Reeve.) Length, 7.5–10 mm. (Tryon, *Manual of Conchology.*)

TYPE in Museum Cuming. Type locality, not known.

RANGE. Monterey to San Diego, California.

Columbella carinata californiana Gaskoin, 1852

Proceedings, Zoölogical Society of London, 12, 1852. Arnold, *Paleontology of San Pedro, California;* Pl. 10, fig. 9, 1903.

Testa oblongo-ovata, subpyramidalis, laevis, nitens, brunnea, vel brunneo variabilis, aliquando lineis tenuibus, fortioribus, aut latiusculis irregularibus; spira acuminata dimidium testae subaequante; anfractibus septem convexis; apertura lata subquadrangulari; labio externo tenuiusculo intus denticulato, labio interno leviter denticulato; dorso antice transversim striato; peritremate purpureo-nigricante; canali brevi. (Gaskoin.)

Shell oblong-ovate, smooth and shining, rather pyramidal, of a brown color, varying much in intensity and markings, in being sometimes uniform, in others with one or two thin darker-colored cinctures, or with broad and continuous dark irregular markings spirally passing on the whole to be lost in the deeper color of the apicine volutions; spire acuminated, about half the length of the shell; volutions seven, convex; aperture wide, subquadrangular; outer lip rather thin, denticulated within on its whole extent; inner lip slightly denticulated along its rather angular inner edge; fine striae transverse the anterior part of the dorsum; peritreme of a dark purple-brown color; channel very short. Length, 40/100; width, 20/100 in. (Gaskoin.)

Type in Cuming Cabinet. Type locality, San Diego, California.

Range. Forrester Island, Alaska, to Salina Cruz, Mexico.

Columbella gausapata Gould, 1850

Proceedings of the Boston Society of Natural History, 3:170. *Mollusca and Shells of the United States Exploring Expedition;* Pl. 19, fig. 337, 1852.

T. parva, solidula, elongata, ovato-conica, ad basim spiraliter striata, sub epidermide rudi subrufo concinne rufo-recticulata vel variomode maculata aut fasciata; spira conico-turrita, anfr. 6–7 convexiusculis, ultimo 2/3 long, testae, antice subito in rostrum brevem angustato; sutura valde impressa; apertura angusta lunata; labro simplici, rufo, intus sparse denticulato. Long., ½; lat., 1/5 poll. (Gould.)

Shell small, solid, ovate-turreted, elongated, without striation except a few lines around the beak, smooth, polished, covered with a dense russet-colored epidermis, having indistinct, paler maculations beneath. Whorls six or seven, nearly flat, the last less than two-thirds the whole length, abruptly sloping to the beak, which is short; suture linear, abrupt, deeply impressed; aperture one-third the length of the shell, narrow-lunate; lip simple, with a few rib teeth within, both margins deep purplish-brown; callus on the pillar not abundant; interior pale-lilac. (Gould.)

TYPE in museum of the Boston Society of Natural History. Type locality, Puget Sound.

RANGE. Port Etches, Alaska, to San Diego, California.

Columbella casciana Dall, 1919

Proceedings of the United States National Museum, **56**: 35.

Shell small, yellowish, acute, with a three-whorled smooth nucleus beginning with a very minute apex and five flattish subsequent whorls; suture distinct, minutely channeled; axial sculpture of faint incremental lines; spiral sculpture of very faint striae on the whorls behind the periphery, and a few stronger grooves near and on the canal; base subangular at the periphery, flattened in front; aperture narrow, simple, body slightly glazed, pillar short with a strong keel at its anterior border; canal short, deep. Height of shell, 9; of last whorl, 6; of aperture, 3.5; diameter, 4 mm. (Dall.)

TYPE in United States National Museum, No. 209456. Type locality, United States Fish Commission Station 4322, off La Jolla, San Diego, California.

RANGE. Known only from type locality.

Columbella callimorpha Dall, 1920

Proceedings of the United States National Museum, **56**:330.

Shell small, yellowish, with brown mottlings under a thin brownish periostracum, with about five whorls; including a small smooth nucleus; suture obscure, whorls only slightly convex on the spire; surface smooth except for a few spiral striae on the canal; aperture narrow, with a rather wide commissure at the posterior junction of the lip and body; outer lip slightly thickened, with four or five denticles on the inner face; body polished, pillar short; canal short and wide. Height of shell, 5; of last whorl, 3.5; diameter, 2.5 mm. (Dall.)

TYPE in United States National Museum, No. 271491. Type locality, San Diego, California.

RANGE. San Diego Bay, California, to Magdalena Bay, Lower California.

Subgenus ASTYRIS H. & A. Adams, 1853

Columbella rosacea Gould, 1840

American Journal of Science, **38**:197; *Invertebrates of Massachusetts,* 357; text fig. 195.

Testa parva, conico-acuta, alba, rosaceo, tincta; anfractibus sex, plano-convexis, spiraliter lineolatis; apertura spira breviore; columella arcuata, planulata. Long., 3/10; lat., 3/20 poll. (Gould.)

Shell small, elongated, acutely conic, white, tinged with rose color, closely covered with minute revolving lines, most conspicuous near the base of the shell, in most parts microscopic; lower whorl as long or longer than the rest of the spire; suture faintly impressed, but distinct; aperture about two-fifths the length of the shell, narrow-ovate; outer lip sharp, a little everted, smooth within, gently curving to its junction with the spire; pillar arcuated, a little flattened, smooth, and white. Length, three-tenths of an inch; breadth, three-twentieths of an inch. (Gould.)

TYPE in? Type locality, off Cohasset.

RANGE. Icy Cape, Arctic Ocean, to Pearl Straits, Alaska; circumboreal.

Described as *Buccinum rosaceum*.

Columbella amiantis Dall, 1919

Proceedings of the United States National Museum, **56**:331.

Shell small, pure white, solid, with seven moderately-rounded whorls exclusive of the (lost) nucleus; suture distinct, not appressed; axial sculpture of more or less evident incremental lines, sometimes so strong as to suggest riblets; spiral sculpture of fine threads, almost obsolete on most of the shell but coarser and more evident near the canal, covering the whole surface with narrower interspaces; aperture semilunate, outer lip simple, body erased, pillar very short, canal hardly differentiated. Height of shell, 13; of last whorl, 8; of aperture, 4; diameter, 6 mm. (Dall.)

TYPE in United States National Museum, No. 221008. Type locality, beach at Kiska Harbor, Aleutians, Station 1026.

RANGE. Known only from type locality.

Columbella permodesta Dall, 1890

Proceedings of the United States National Museum, **12**:327; Pl. 5, fig. 4.

Shell small, thin, polished, with five rounded whorls, a pale yellowish epidermis covering a bluish-white substratum; transverse sculpture only of faint incremental lines; spiral sculpture of fine spiral threads on the base of the shell, obsolete or absent between the sutures; aperture wide, oval; outer lip thin, simple, very slightly reflected; axis pervious; canal wide, extremely short, hardly differentiated; pillar smooth, twisted, not callus; suture distinct, not appressed or channeled; nucleus rounded; slightly flattened, generally eroded. Maximum longitude of shell, 14; maximum latitude, 7 mm. (Dall.)

TYPE in United States National Museum. Type locality, Station 2807, near the Galapagos Islands.

RANGE. Unalaska, Aleutian Islands, to San Diego, California.

Columbella aurantiaca Dall, 1871

Plate 28, fig. 5

American Journal of Conchology, **7**:115; Pl. 15, fig. 13.

Shell minute, fusiform, smooth, with five gently rounded, noncarinated whorls. Color generally orange yellow, semitranslucent, and without markings, but occasionally darker, passing into dark brown, or with close zigzag brown lines on the yellow ground. Columella slightly arcuated, outer lip slightly sinuated, hardly striate inside. No callus on the columella. Nucleus subglobular, rounded above, swollen as large or larger than the first whorl in most specimens. Long., .18; lat., .08 in. (Dall.)

Type in United States National Museum. Type locality, Monterey, California.

Range. Monterey, California, to Magdalena Bay, Lower California.

Described as *Astyris aurantiaca.*

Columbella hypodra Dall, 1916

Plate 16, fig. 6

Conchological Memoranda, **12**:5; Pl. 1, fig. 5.

A new name for *Astyris variegata* Stearns, not *Columbella variegata* Menke, 1828.

Shell small, elongated, acutely conic, light rufous-brown or sienna-yellow under a thin brownish or greenish epidermis; with whitish median and sutural bands more or less interrupted; in some specimens these bands are connected by waved lines of a darker brown; surface of shell when free from epidermis, smooth and shining, marked with delicate incremental lines, and on the lower portion of the body whorl with narrow grooves; apex rounded, whorls seven, convex; suture well-defined, aperture ovate, about one-third the length of the shell; outer lip simple, in some specimens a little thickened with small tubercles on the inner side. Long., .3; lat., .12 in. (R. E. C. Stearns.)

Type in United States National Museum. Type locality, San Diego, California.

Range. Puget Sound to Puerto Libertad, West Mexico.

Genus **NITIDELLA** Swainson, 1840

Shell oval, smooth, with elevated spire; aperture somewhat effuse below; columella with two small anterior plications; outer lip somewhat thickened. (Tryon, *Manual of Conchology.*)

Type. *Columbella nitida* Lamarck.

DISTRIBUTION. West Indies, Philippines, Hawaiian Islands, South Africa, Gulf of California, Central America, China, Japan, Australia.

Fossil: Tertiary.

Nitidella gouldi Carpenter, 1856

Proceedings, Zoölogical Society of London, 208, 1856.

N. t. parva, elongata, conica, laevi, circa basin spiraliter, striata; anfr. vii. subplanatis, suturis distinctis; albida, aurantio varie picta; apertura; subquadrata, labro sinuato, subacuto, intus conspicue dentato; labio parvo, vix crenato; apice interdum decollato. Long., .32; long. spir., .15; lat., .15 poll. (Carpenter.)

Shell fusiformly ovate, yellowish-white, reticulated with pale brown, the interstices being of irregular shapes and sizes—or, in other words, it is pale brown, closely spotted irregularly with yellowish-white; epidermis very thin; apex eroded, remaining whorls 6, flattish or scarcely convex, smooth, separated by a deep suture, giving the spire a slightly turreted aspect; last whorl feebly angular at the middle, contracted inferiorly, and striated around the extremity; aperture pale lilac within, occupying about three-sevenths of the entire length; outer lip arcuate, thickened, especially at the upper part; thin at the margin, and armed within the mouth with about 7 elongated tubercles; columella arched above, oblique at the base, with indications of one or two tubercles below the middle, covered with a thin whitish callosity; basal canal a little recurved. (Tryon, *Manual of Conchology.*)

TYPE in Museum Gould. Type locality, Santa Barbara, California.

RANGE. Kodiak, Alaska, to San Diego, California.

This is the *Nittidella dalli* E. A. Smith.

Nitidella luculenta Dall, 1919

Proceedings of the United States National Museum, **56**:331.

Shell small, pale, with pale variations of brown or none, covered with a fibrous pale-brownish periostracum; with about six whorls, including an extremely minute smooth nucleus; suture distinct, not appressed; surface of the whorls moderately convex; axial sculpture none, but faint incremental lines; spiral sculpture only of a few spiral grooves on the back of the canal; aperture simple, the outer lip thin, not lirate within, body with a slight glaze, pillar thickened with an obvious keel on its anterior edge; canal short, wide; operculum normal. Height of shell, 7; of last whorl, 5.5; diameter, 3.5 mm. (Dall.)

TYPE in United States National Museum, No. 211068. Type locality, United States Fish Commission, Station 3180, in the Gulf of the Farallones, off San Francisco, California, in 24 fathoms.

RANGE. Straits of Juan de Fuca to Coronado Islands.

Genus **AESOPUS** Gould, 1860

Testa fusiformis, gibbosa, antice late truncata; apertura lunata, angulo postico callo impleto; columella simplici vitreo induta; sutura prope aperturam abnormaliter arcuata. (Gould.)

Shell fusiform, gibbous, widely truncate in front; aperture lunate, with a posterior callus, columella simple, vitreous; suture abnormally arcuate near the aperture. The curious curve of the suture near the posterior angle of the aperture, as if it had been drawn backward, thereby pulling back this angle and curving the last whorl downward, is very peculiar. (Tryon, *Manual of Conchology.*)

TYPE. *Aesopus japonicus* Gould.

DISTRIBUTION. California, Lower California, Panama, Japan.

Aesopus eurytoides Carpenter, 1864

Annals and Magazine of Natural History, series 3, **14**:47.

T. testa parva, turrita, gracili; albida, saepius fascia circa peripheriam maculis fusco-aurantiacis picta; anfr. nucl. mamillatis, lavibus; norm. v., effusis, subplanatis, ultimopaulum constricto; costulis radiantibus circ. xx., aperturam versus evanidis; apertura subquadrata; labro haud incrassato, interdum intus subtiliter striato, haud dentato; labio appresso; columella abrupte truncata. Long., .03; long. spir., .02; lat., .11 poll. (Carpenter.)

Variat basi fusco tincta, seu tota superficie ut in *Nitidella cribraria* picta. (Carpenter.)

White, with a revolving series of brown maculations on the periphery; sometimes the base is brown, or the whole surface brown-spotted; with about twenty longitudinal riblets, becoming evanescent toward the aperture; aperture subquadrate, lip scarcely thickened, striae finely within, columella abruptly truncate. Length, .3 in. (Tryon, *Manual of Conchology.*)

TYPE in British Museum? Type locality, Cape San Lucas, Lower California.

RANGE. San Diego, California, to Panama.

Described as *Truncaria eurytoides.*

Aesopus chrysalloides Carpenter, 1886

Proceedings of the California Academy of Sciences, **3**:223. Arnold, *Paleontology of San Pedro, California;* Pl. 5, fig. 8.

?A. t. parva, eleganter, effusa, marginibus spirae utrinque excurvatis; albida, rufofusco concinne punctata seu tincta; interdum striga albida subsuturali, rufofusco tesselata; anfr. nucl. iii. laevibus, haud, tumidis, apice declivi; norm. v.t. adolescente planatis, dein tumidioribus, suturis distinctis; tota superficie elegantissime tenuiter sulcata, sulcis aequidistantibus, anfr. penult. circ. xx.; apertura flexuosa subpyriform; canali oblique sinistrorsum truncata, axi quasi umbilicata; labro intus acuto, postice sinuato, deorsum quasi tumidiore, intus vii-dentato; columella torta; labio antice rugis paucioribus interdum munito. Long., 0.37; long. spir., 0.22; lat., 0.14 poll. (Carpenter.)

Shell cylindrically oblong, shining, whorls seven, slightly rounded, covered with microscopic spiral lines; yellowish to chocolate; lip scarcely thickened and very slightly dentate within. Length, .8 mm. (Tryon, *Manual of Conchology.*)

TYPE in State Collection, No. 613. Type locality, San Pedro, California.

RANGE. San Pedro to San Diego, California. Pleistocene: San Pedro to San Diego, California.

Aesopus sanctus Dall, 1919

Proceedings of the Biological Society of Washington, **32**:250.

Shell small, light pinkish-brown, with somewhat less than five whorls of which one is composed of a globose smooth nucleus; suture distinct, the whorls moderately convex, the aperture simple, short, the columella smooth, twisted, shorter than the outer lip, the whole surface minutely evenly spirally striated. Height, 4.3; of last whorl, 2.0; diameter, 1.6 mm. (Dall.)

TYPE in United States National Museum, No. 308958. Type locality, Todos Santos Bay, Lower California.

RANGE. Known only from type locality.

Aesopus myrmecoön Dall, 1916

Nautilus, **30**:27.

Nitidella folosa Stearns, being preoccupied, was called *Columbella stearnsi* by Tryon, 1883; it is referable to the genus *Aesopus.* A minute species four millimeters long, of a whitish color more or less tinged or spotted with brown, almost duplicates *Aesopus stearnsi* in form and sculp-

ture, though so much smaller than the Florida species. I have named it *Aesopus myrmecoön.* (Dall.)

TYPE in United States National Museum, No. 105498. Type locality, San Pedro, California.

RANGE. San Pedro, California, to Point Abrejos, Lower California.

Aesopus goforthi Dall, 1912

Nautilus, **25**:127.

Shell smooth, slender, elongate, with inconspicuous sutures and about eight whorls; nucleus defective, smooth; subsequent whorls gradually increasing, moderately convex; color greenish-waxen with flammules of dark chestnut so arranged on the last whorl as to form two irregular bands, one above and the other below the periphery, which also show in the interior of the aperture and on the base of the pillar; the paler portion of the surface is also irregularly mottled with opaque whitish blotches. Aperture short, rather wide; the outer lip simple, sharp, smooth within; body and pillar smooth, with a thin wash of callus; canal short, wide, not recurved. Length of shell, 12; of last whorl, 6; of aperture, 4; maximum diameter of shell, 3.3 mm. (Dall.)

TYPE in United States National Museum, No. 249624. Type locality, Monterey, California.

RANGE. Known only from type locality.

Genus **AMPHISSA** H. & A. Adams, 1853

Shell with the aperture anteriorly dilated, the contraction near the spire obsolete. (H. & A. Adams.)

Shell bucciniform, longitudinally ribbed; spire elevated; aperture rather wide, enlarging below and terminating in a wide anterior sinus; inner lip callous, plicate below; outer lip not thickened on the margin, plicate within. (Tryon, *Manual of Conchology.*)

TYPE. *Amphissa corrugata* Reeve.

DISTRIBUTION. West coast of North America.

Amphissa columbiana Dall, 1916

Plate 16, fig. 1

Nautilus, **30**:27; Pl. 6, fig. 9; Pl. 11, fig. 9.

Shell yellowish-brown, sometimes obscurely spotted and variegated, white within the aperture. Length, 1 in. (Reeve.)

Described as *Buccinum corrugatum* Reeve, 1846. This is not the *Buccinum corrugatum* of Brocchi, 1814, and, since it is very abundant on the

coast of British Columbia and in Puget Sound, it may take the name *columbiana*. (Dall.)

TYPE in Museum Cuming. Type locality, Puget Sound.

RANGE. Chiachi Islands, Alaska, to San Pedro, California.

Amphissa versicolor Dall, 1871

American Journal of Conchology, 7:113; Pl. 16, figs. 10, 11.

Shell of about five whorls, last whorl two-thirds the length of the shell. Epidermis imperceptible; shell ornamented with rather strong sinuous ribs, which often invade the lower third of the whorl; there are fourteen to sixteen of these on the last whorl in well-grown individuals, and they are crossed by rather strong, thread-like lines, between broad channels on the convexity of the whorls, which become narrower and groove-like on the anterior part of the last whorl. They are about seventeen in number, in average adult specimens, on the last whorl. Post-labial pinch almost obsolete, quite so in some specimens. Colors very variable, pink-salmon color, livid bluish-purple, brown and pure white, all plain, or variously marked with a network of white and brown lines, patches, dots, etc., etc. Long., .48; lat., .26 in. (Dall.)

TYPE in United States National Museum. Type locality, Monterey, California.

RANGE. Oregon coast to Cerros Island, Lower California.

Amphissa versicolor incisa Dall, 1919

Plate 16, fig. 3

Proceedings of the United States National Museum, 56:331. *Bulletin 112*, United States National Museum; Pl. 11, fig. 10.

Shell varicolored, acute, solid, with a thin brownish fibrous periostracum, with about eight whorls, including the smooth nucleus of about one whorl, the rest of the shell strongly sculptured; spiral sculpture of (on the spire about 6, on the last whorl about 16) strong, low, rounded, equal and equally spaced cords, except one in front of the almost channeled suture, which is slightly more prominent than the others, separated by much narrower deep grooves; the spirals not nodulous when they cross the ribs; axial sculpture of (on the penultimate whorl, about 14) obliquely protractive rounded ribs with subequal interspaces, somewhat obsolete near the aperture, which is semilunate; outer lip hardly thickened, whitish, lirate within; body and pillar with a layer of whitish enamel; canal short,

deep, slightly recurved. Height of shell, 13.5; of last whorl, 10; of aperture, 6.5; diameter, 7 mm. (Dall.)

TYPE in United States National Museum, No. 12285. Type locality, Laguna Beach, California.

RANGE. Laguna Beach to San Diego, California.

Amphissa versicolor cymata Dall, 1916

Nautilus, **30**:27.

Shell with distinct brown axially waved lines on a white ground. (Dall.)

TYPE in United States National Museum. Type locality, California.

Amphissa undata Carpenter, 1864

Supplementary Report, British Association for the Advancement of Science, 148. *Proceedings of the California Academy of Sciences,* **3**:158. Keep, *West Coast Shells,* fig. 163.

A. t. parva, rufo-fusca, turrita, epidermide tenui induta; marginibus spire subrectis; anfr. nucleosis iv. laevibus, tumidis, apice mamillato; anfr. normalibus v. valde tumidis, suturis impressis; costis radiantibus ix. valde tumidis, latis, antice et postice obsoletis; interstitiis undatis; liris spiralibus acutioribus, distantibus, costas superantibus, secundum interstitia eleganter undulatis, quarum vi.–viii. in spira monstrantur; apertura ovali, in canalem brevem rectam producta, intus haud lirata; labro acuto, labio acuto extanti ad suturam juncto; columella planata; operculo nassoideo. Long., 0.44; long. spira, 0.20; lat., 0.20 poll. (Carpenter.)

Shell small, turreted, the nuclear whorls smooth, tumid, with mammillate apex, the others longitudinally ribbed, the ribs nine in number, obsolete anteriorly and posteriorly, with distant acute spiral lirae; aperture oval, with a short, straight canal, outer lip acute, not lirate within; color reddish-brown, under a thin epidermis. (Tryon, *Manual of Conchology.*)

TYPE in State Collection, Species 1067. Type locality, Catalina Island.

RANGE. Monterey, California, to Cerros Island, Lower California.

Amphissa bicolor Dall, 1892

Proceedings of the United States National Museum, **15**:213; Pl. 20, fig. 4.

Shell small, pale with brown bands and six convex whorls; nucleus eroded in the specimens; suture distinct, not appressed, whorls full, with 11 to 13 narrow rounded ribs extending nearly from suture to suture; spiral sculpture of numerous flattened strap-like cinguli separated by subequal channeled shallow interspaces; epidermis thin and yellowish; color

of shell pale straw-color with a brownish base and a brown band extending from the periphery half-way back to the suture; aperture about equal to the spire, the penultimate rib behind it a little swollen; pillar slender, polished white with little callus; canal wide, short, recurved; outer lip simple, slightly reflected; not lirate inside. Long. of shell, 14.0; of aperture, 7.7; maximum diameter of shell, 8 mm. (Dall.)

TYPE in United States National Museum. Type locality, deep water off southern California.

RANGE. Farallon Islands to San Diego, California.

Amphissa reticulata Dall, 1916

Nautilus, **30**:27.

Shell of a uniform whitish color, very acute spire, and fine regular corded spiral sculpture crossed by about 17 nearly straight axial narrow ribs. This form is usually in rather deep water. (Dall.)

TYPE in United States National Museum. Type locality?

RANGE. Port Althorp, Alaska, to San Diego, California.

APPENDIX

Genus **LORA** Gistel, 1848 (p. 124)

Lora arctica A. Adams, 1855

Proceedings of the Zoölogical Society of London, p. 121.

B. testa ovato-fusiformi sordide alba epidermide fusco tenui induta, spira aperturam aequante, anfractibus 5, erosis longitudinaliter plicatis postice noduloso-angulatis, transversim obscure sulcatis, anfractu ultimo ventricoso postice carina crenata ornato; aperture ovali, labio expanso canali brevi lato aperto; labro tenui, postice sinu obsoleto instructo. (A. Adams.)

TYPE in Cuming Collection. Type locality, Arctic Seas.

RANGE. Shumagin Islands to Chirikoff Island, Alaska.

B. with dull white shell ovate-fusiform, covered with thin tawny epidermis with spire equal in size to the aperture, 5 whorls eroded longitudinally plicate, nodulous-angulate in the rear, transversely obscurely sulcate, with the last whorl ventricose and ornamented with a crenate keel in the rear; with oval aperture, with inner lip broadly expanded, opening into a short canal; with outer lip thin, incised in the rear by an obsolete sinus. (Translation.)

Genus **CYSTICUS** Stimpson, 1865 (p. 165)

American Journal of Conchology, **1**: 55.

Shell resembling that of some Marginellae or Persiculae, small, thin, and ovate, inflated, smooth and polished; spire very short, but distinct; suture not impressed, but filled up with a glossy deposit of shelly matter; aperture narrow; columella with plaits on the anterior half. (Stimpson.)

RANGE. Atlantic and Pacific coasts of North America.

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Note—Unless otherwise stated the photographs were made by Crandall and the specimens are in the Stanford Collection, natural size.

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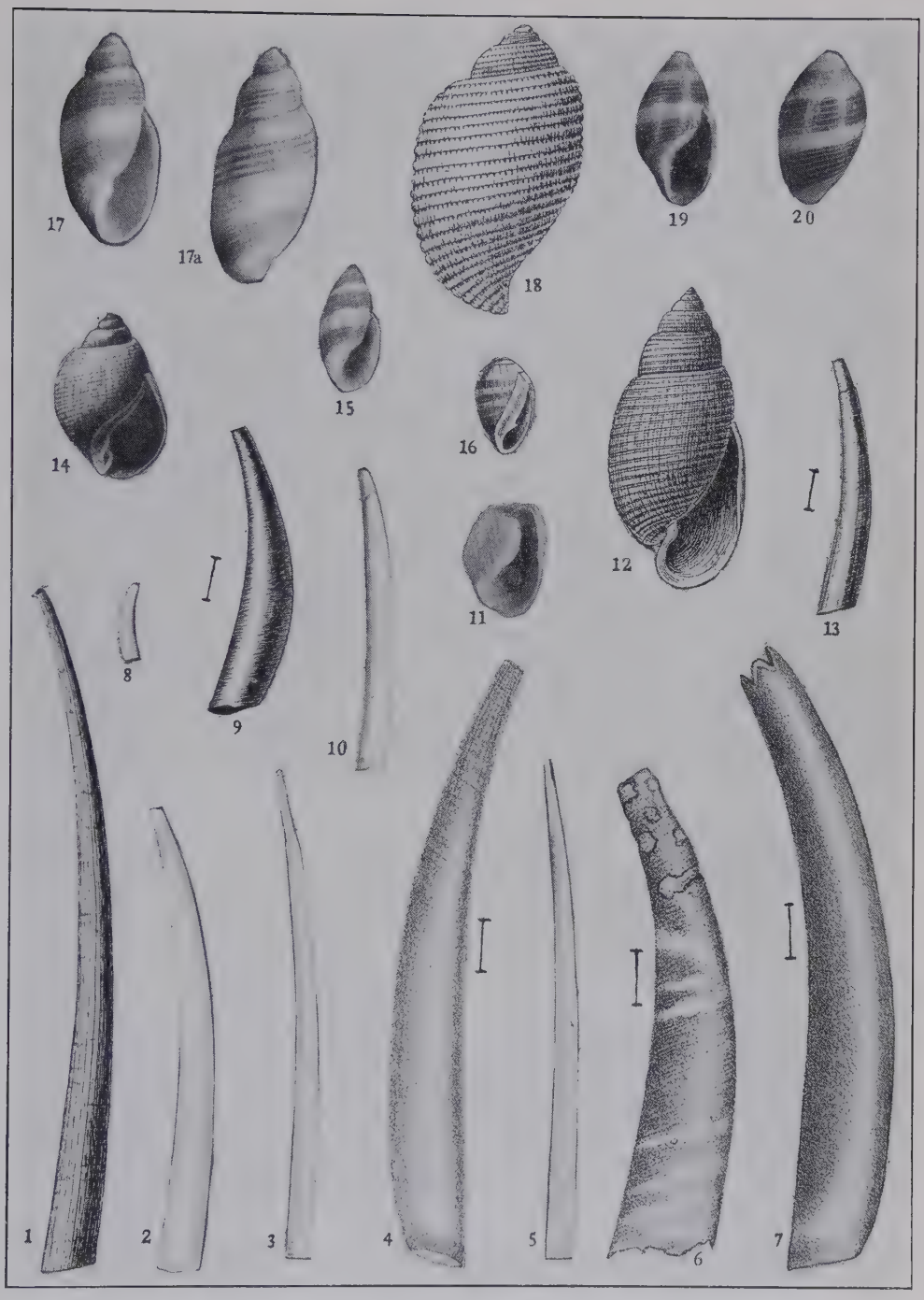

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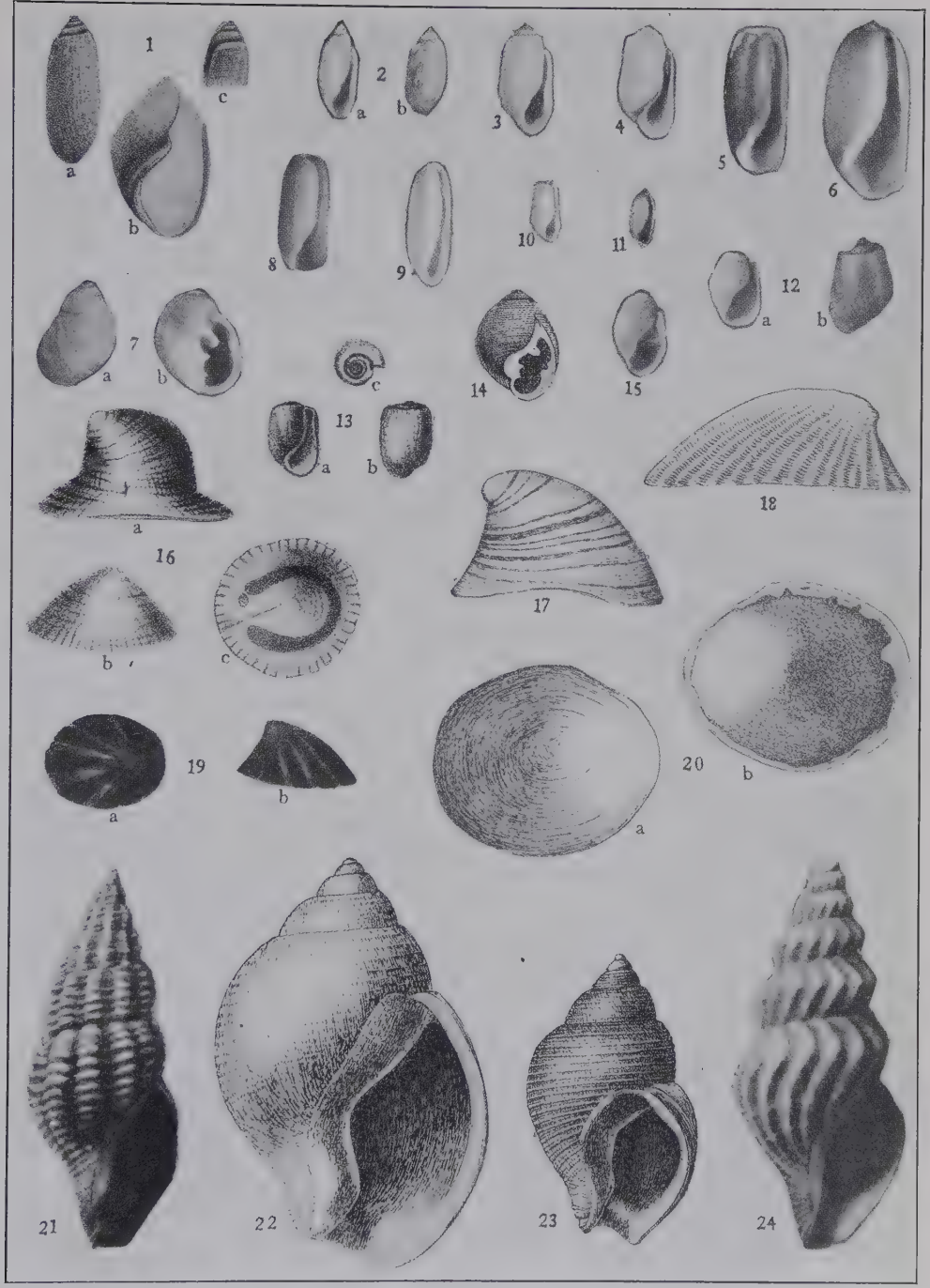
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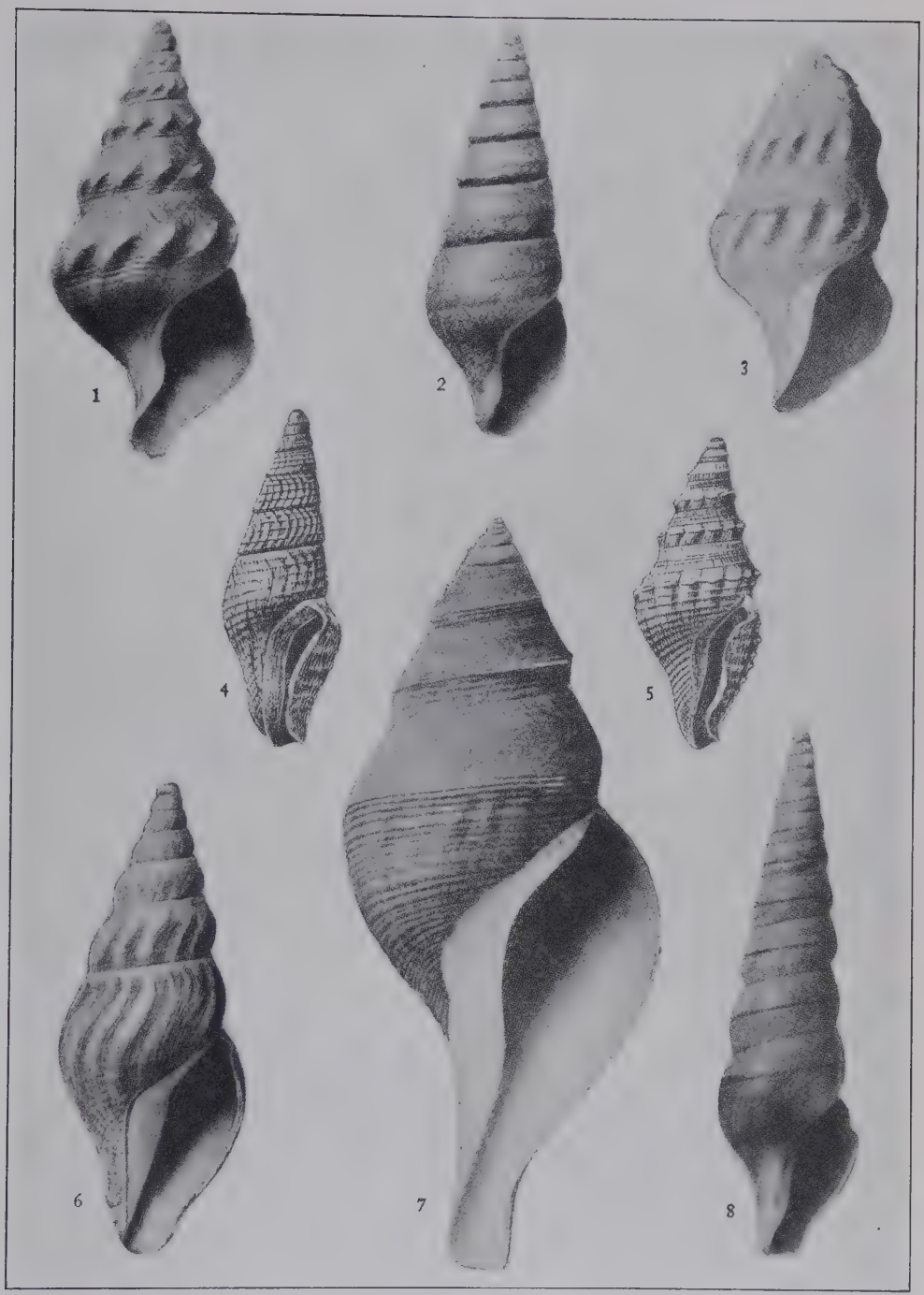

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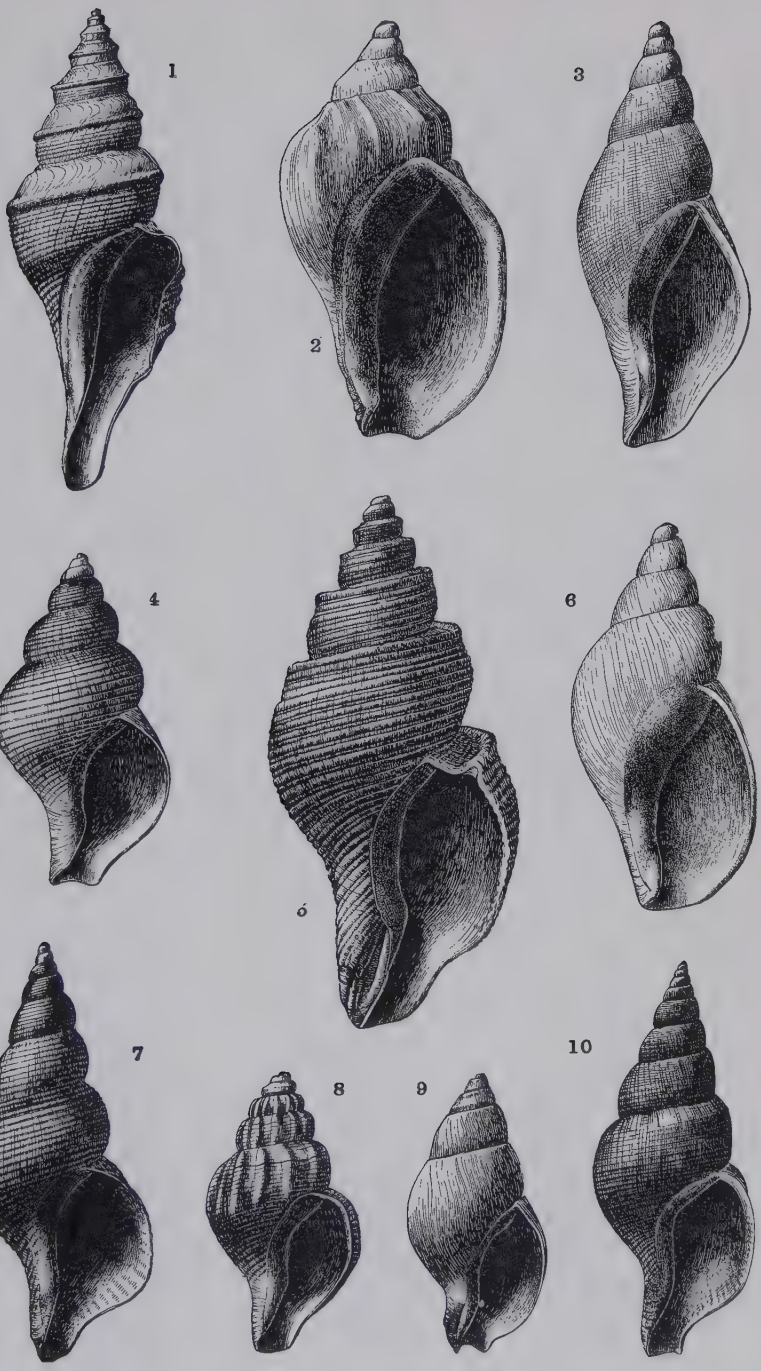

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1. *Buccinum angulosum* Gray 255
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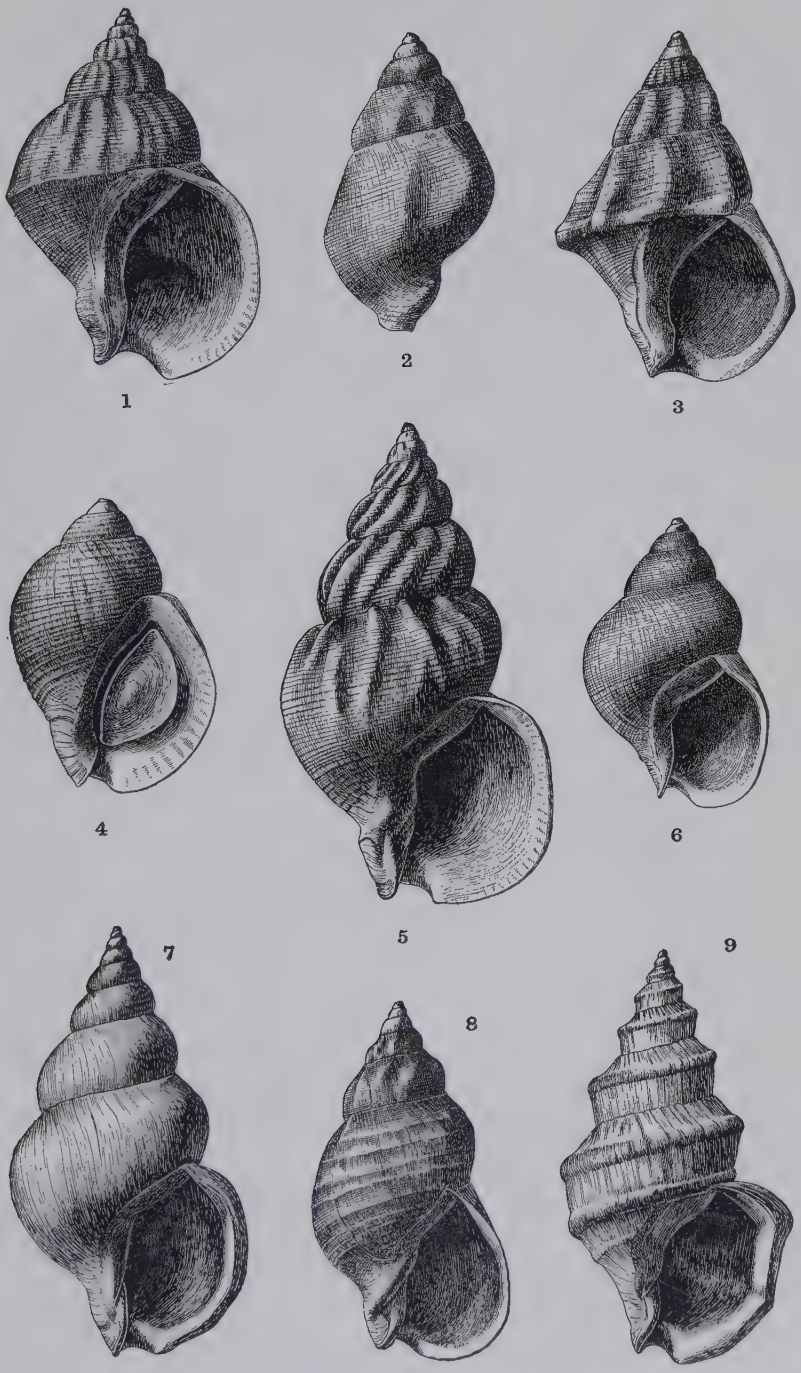

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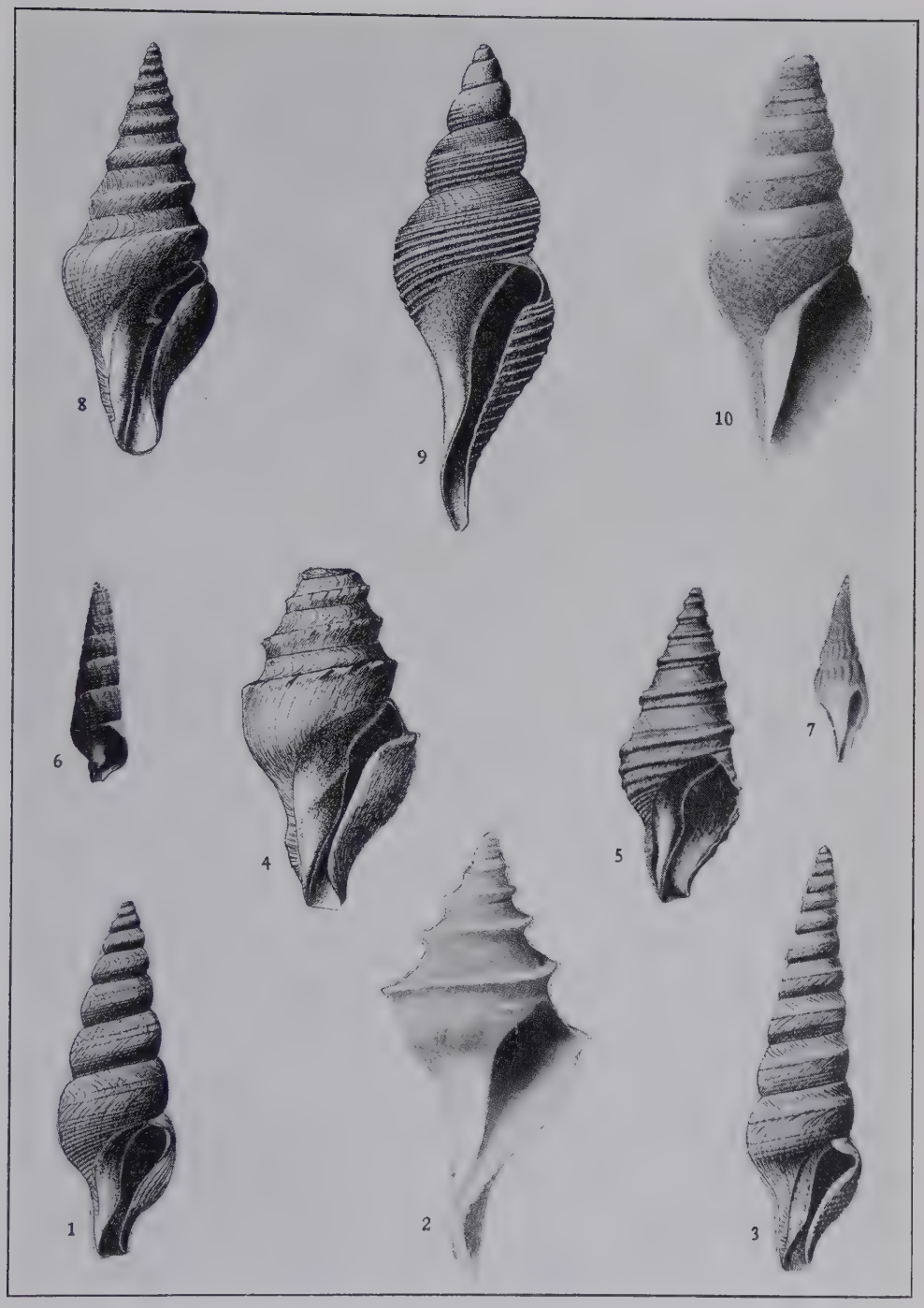

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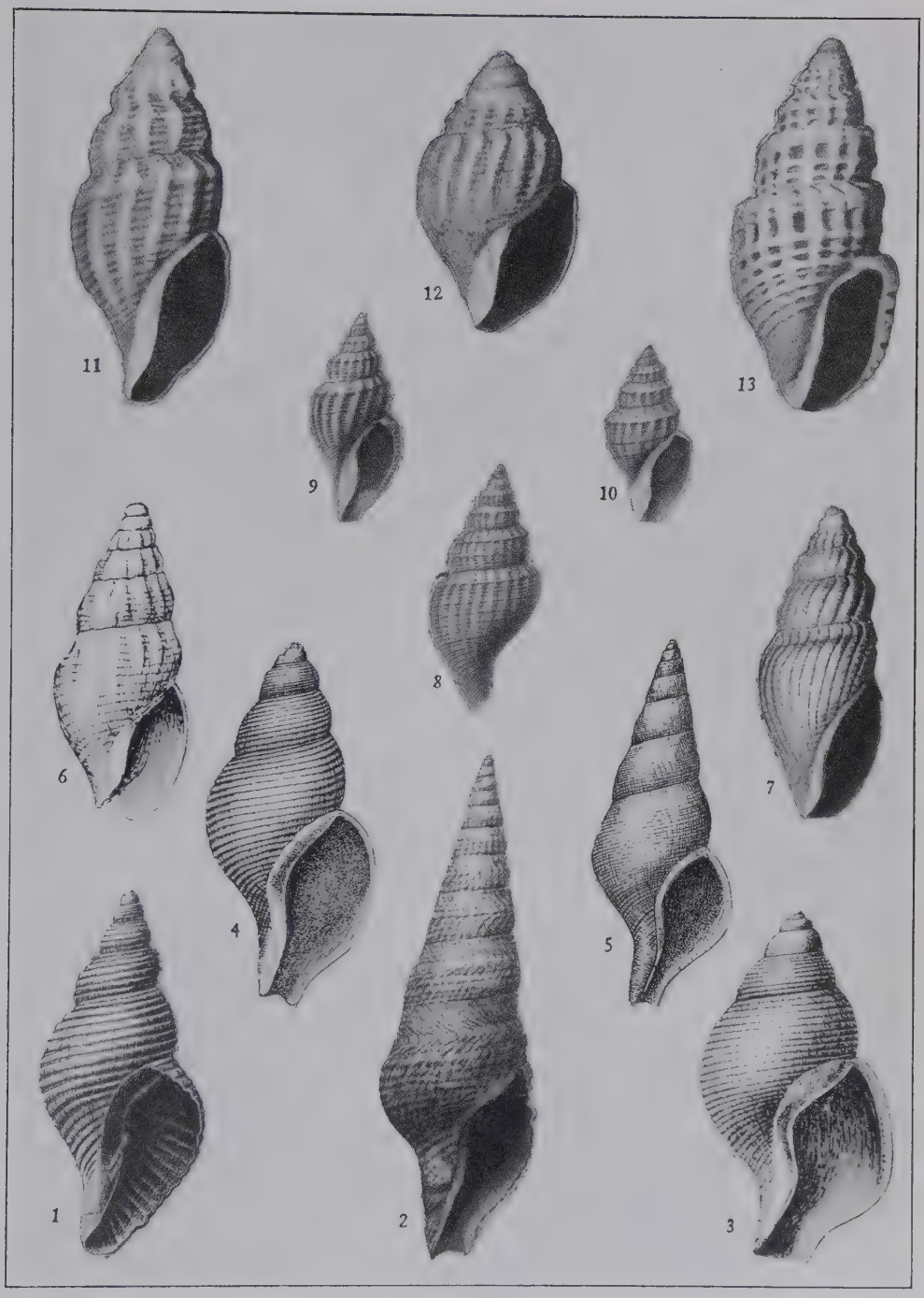

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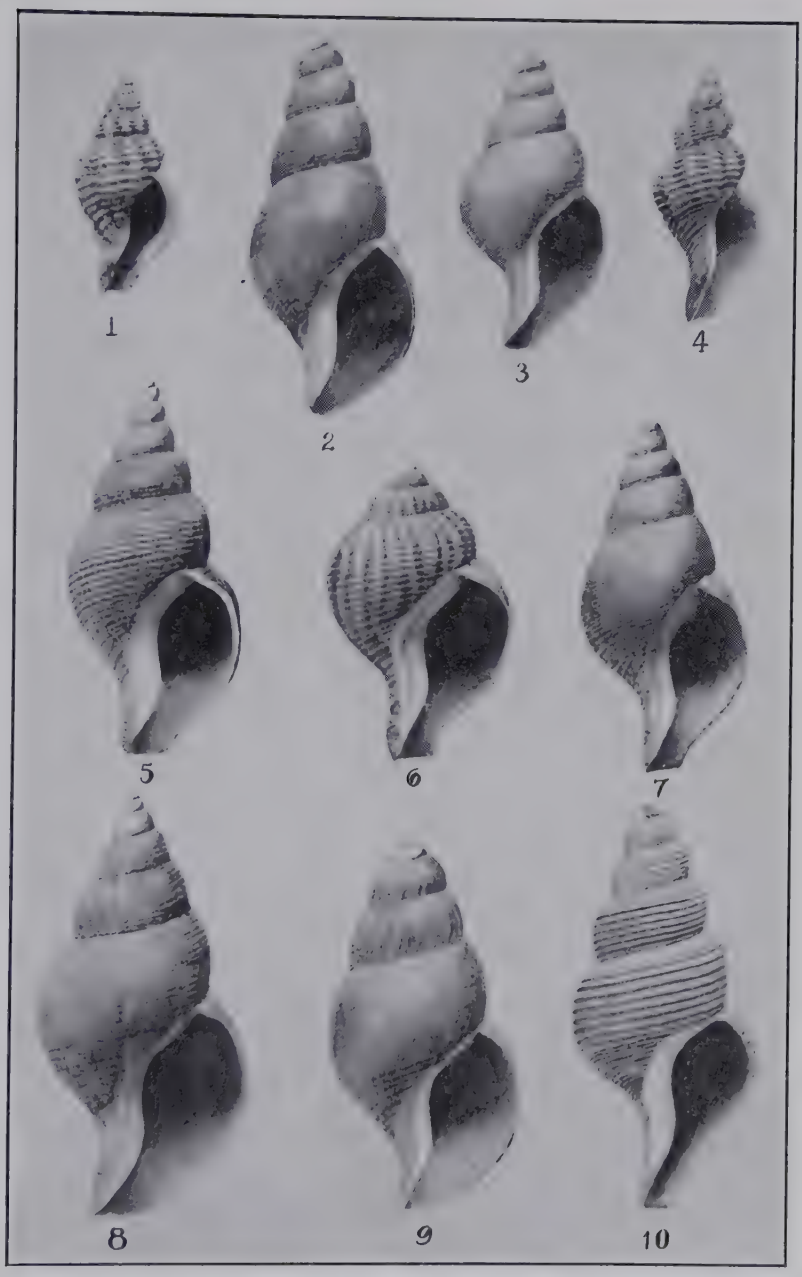

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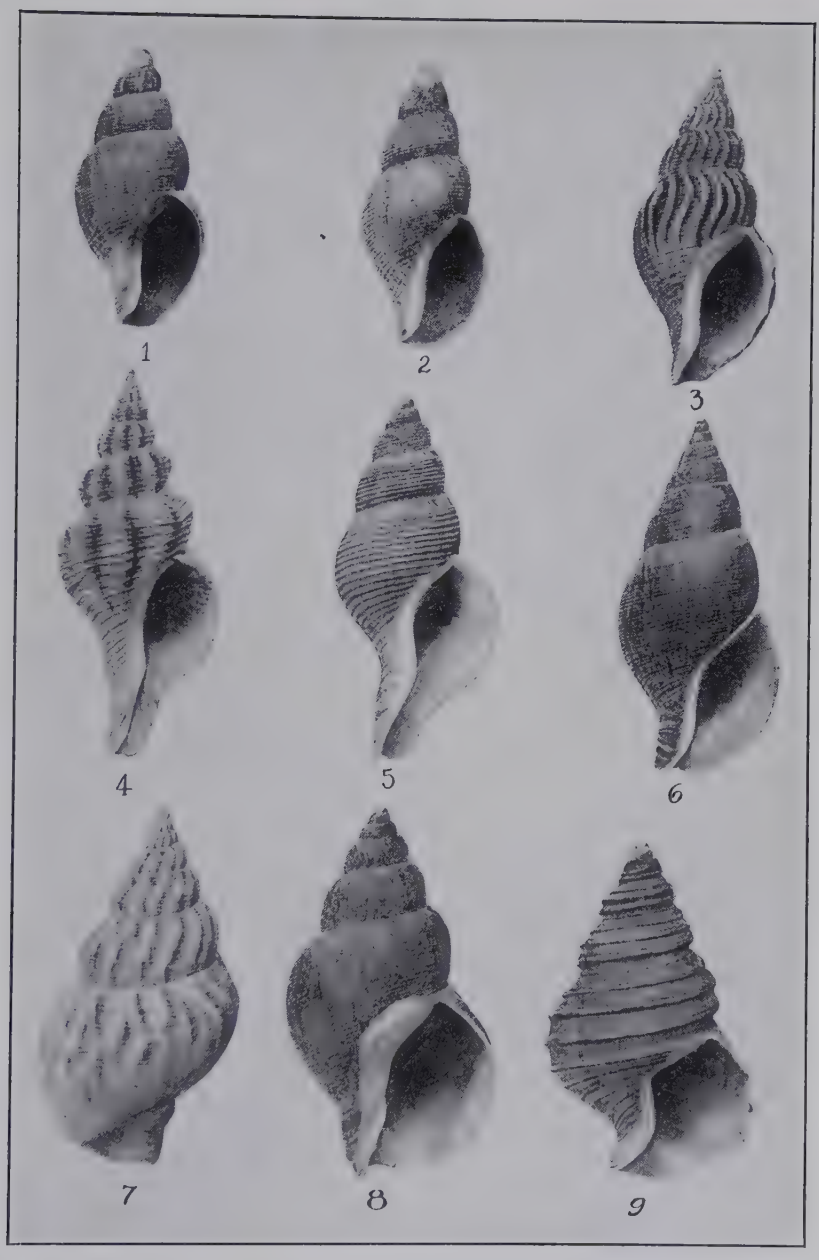

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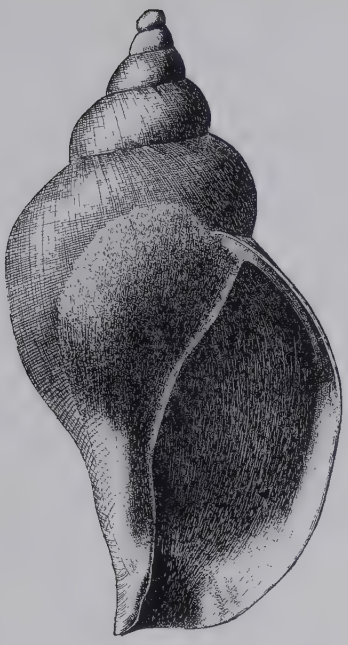

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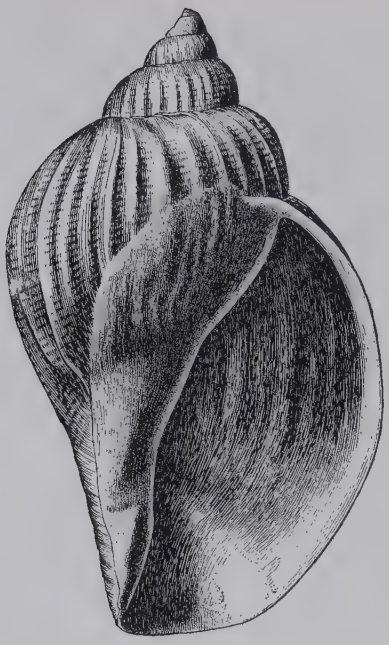

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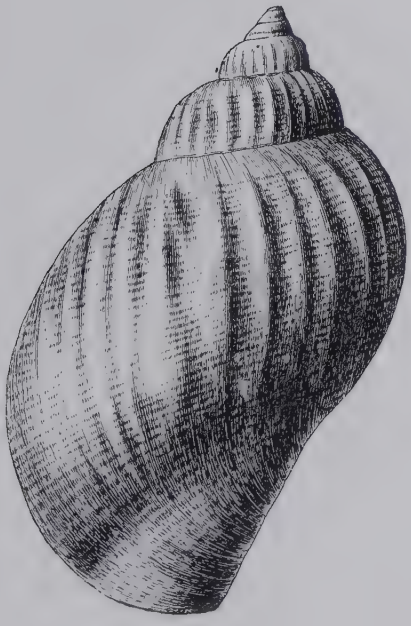

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1, 3. *Chrysodomus liratus* Martyn 237
Refigured type figure, reduced one-half.

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6. *Admete californica* Dall 159
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7. *Cytharella victoriana* Dall 147
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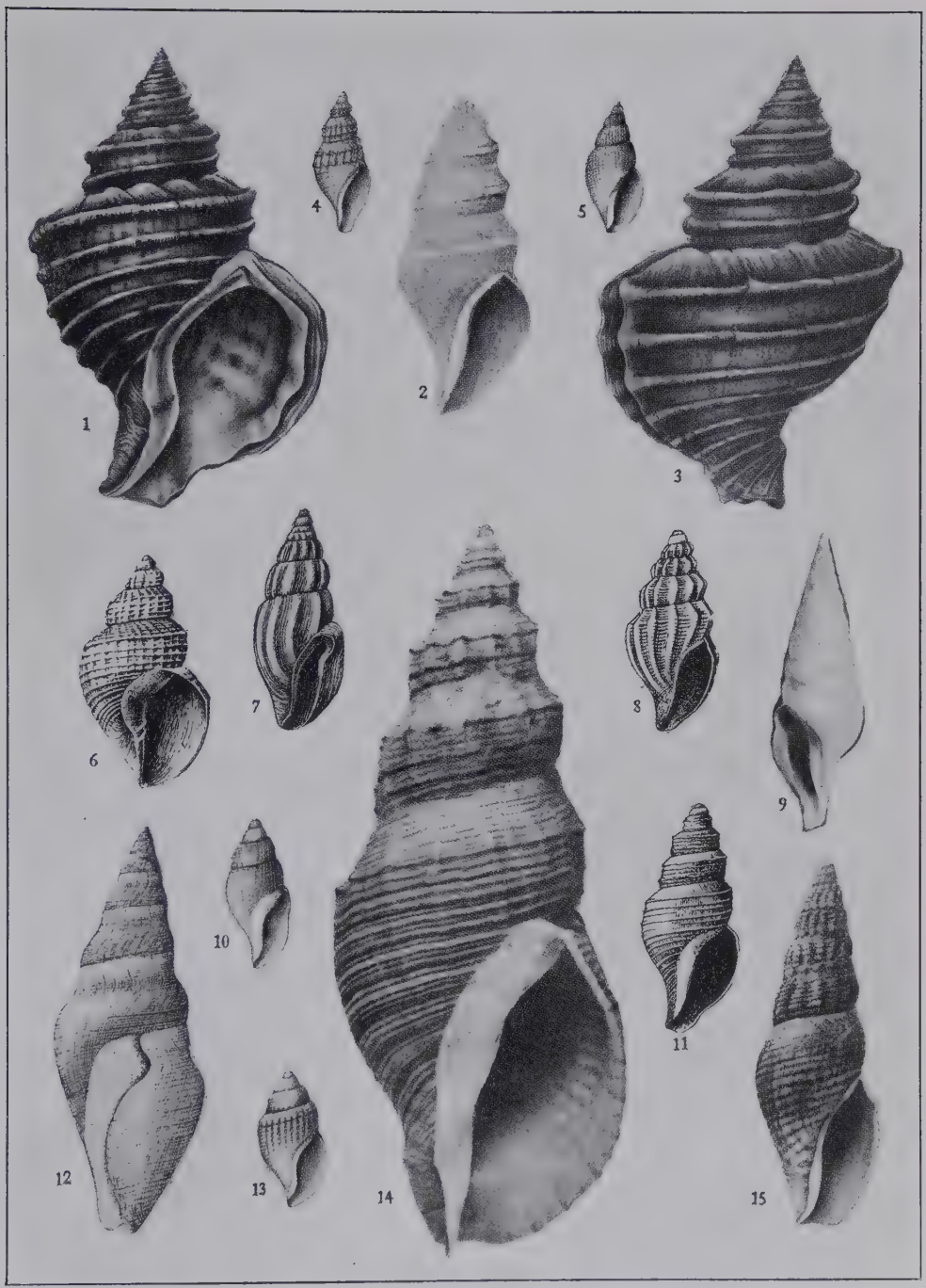

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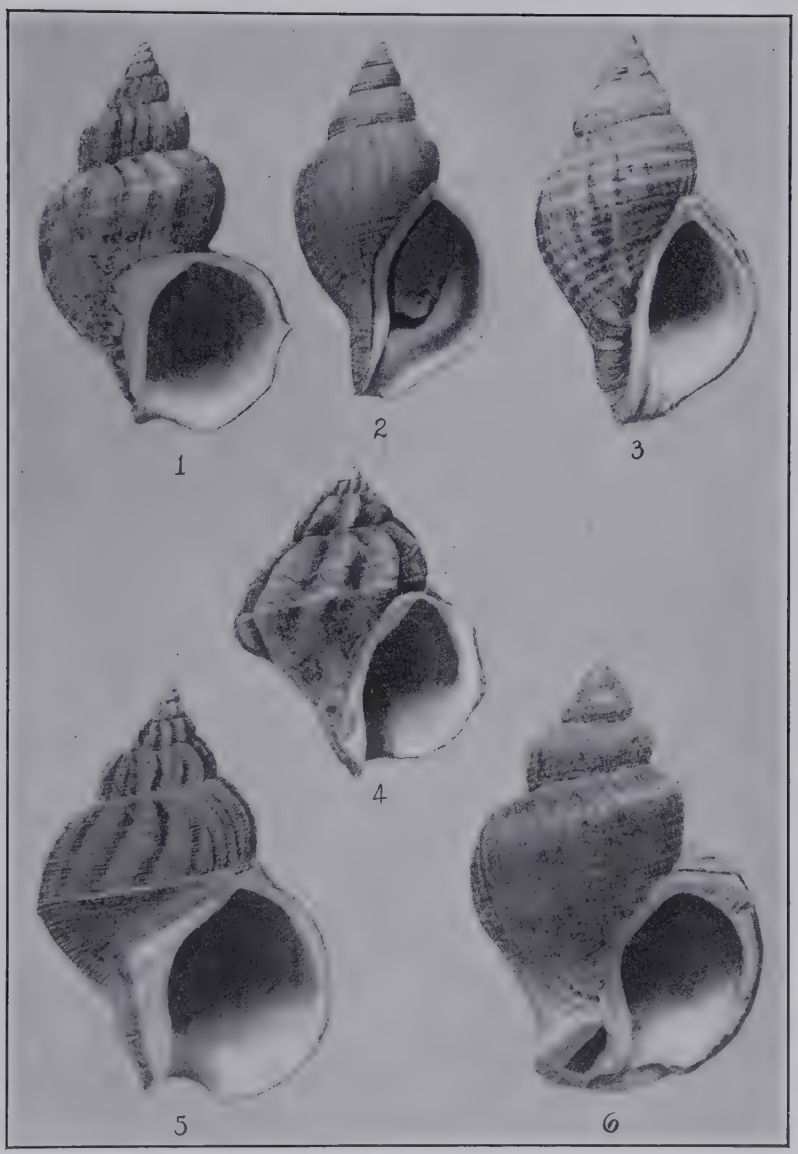

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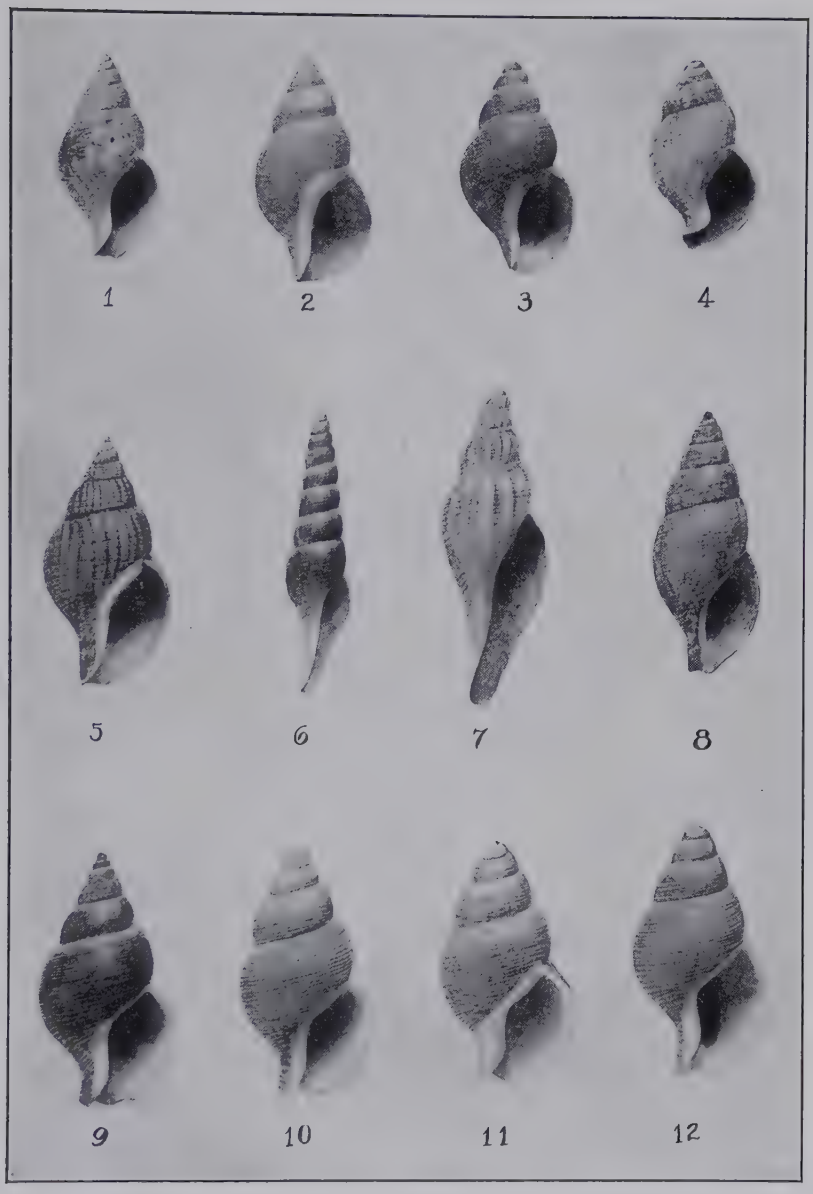
7.	*Phenacoptygma cortezi* Dall	168
8.	*Colus adonis* Dall	222
9.	*Colus dalmasius* Dall	227
10.	*Colus trophius* Dall	218
11.	*Colus severinus* Dall	220
12.	*Colus halidonus* Dall	218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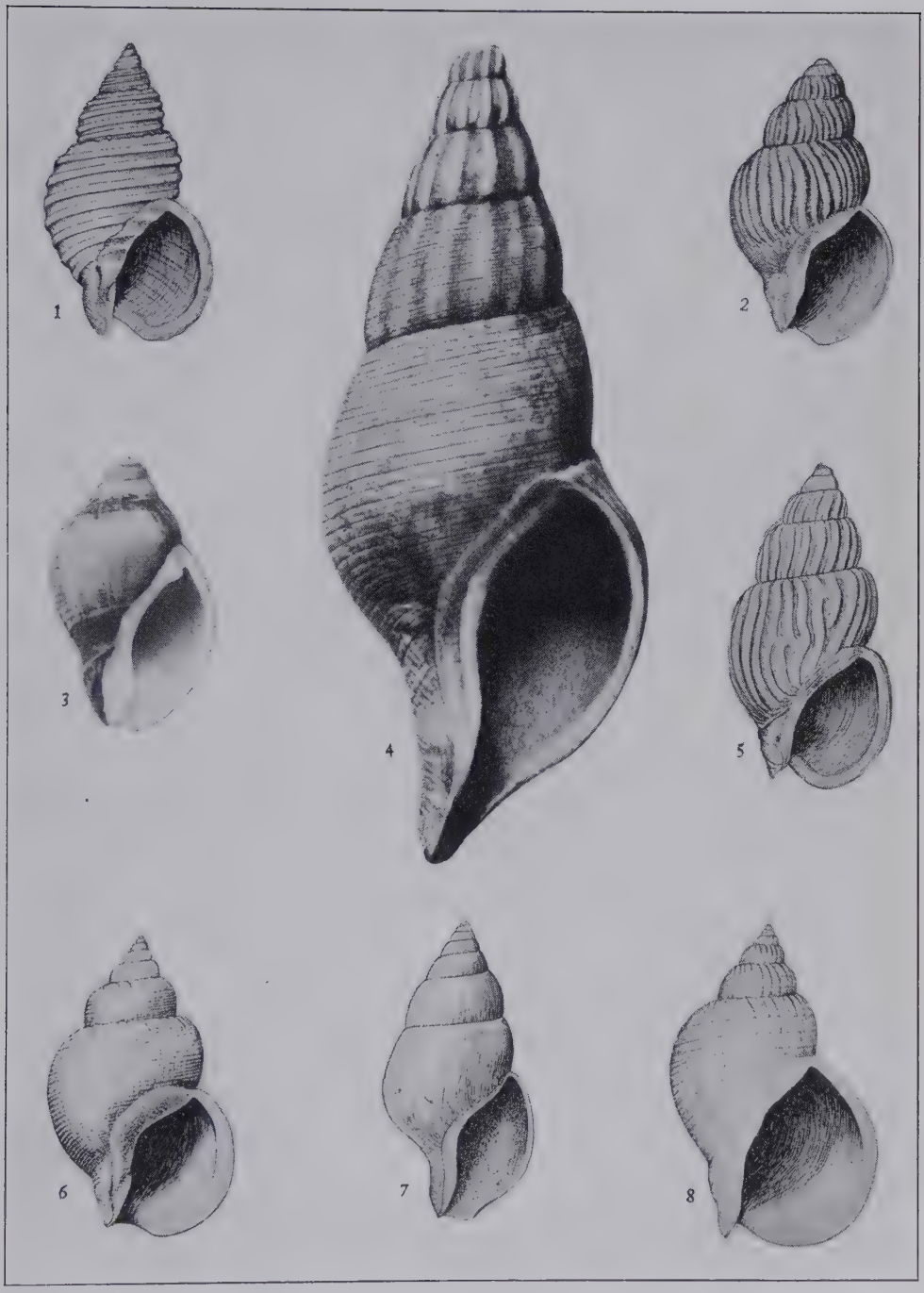

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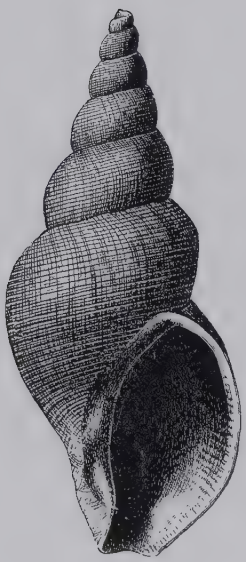

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6.	*Columbella hypodra* Dall	276
7.	*Metzgeria californica* Dall	181
8.	*Beringius marshalli* Dall	196
9.	*Volutopsius stefanssoni* Dall	187
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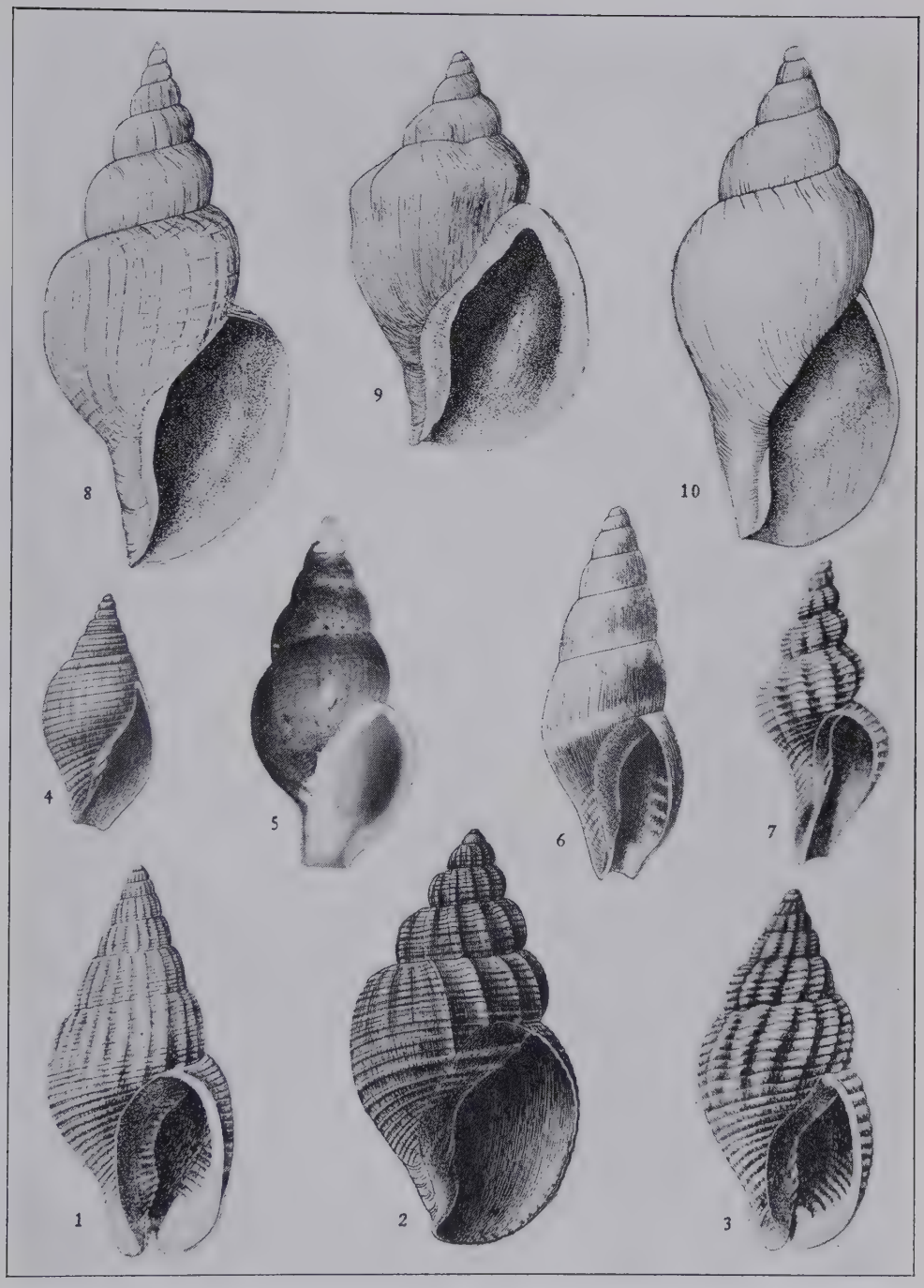

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From *Proceedings of the United States National Museum,* except figures 9 and 10, which are from American Museum of Natural History, New York

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3.	*Mohnia robusta* Dall	199
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6.	*Buccinum diplodetum* Dall	247
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10.	*Buccinum angulosum* Gray	255
11.	*Buccinum simulatum* Dall	251

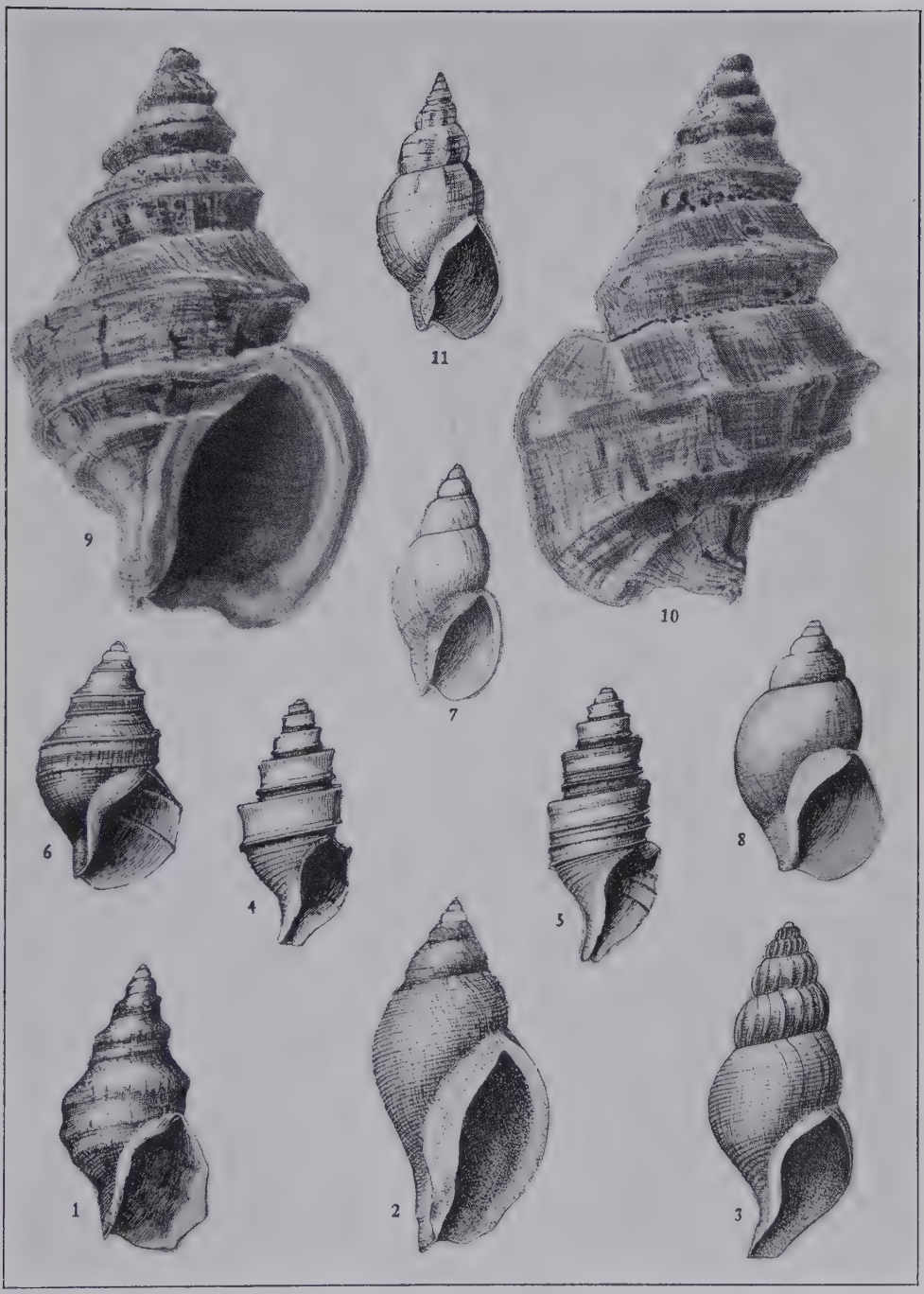
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Plate 18

This plate from *Marine Shells of Puget Sound and Vicinity.*

FIGURE		PAGE
1.	*Clathrodrillia halcyonis* Dall	73
2.	*Lora kyskana* Dall	97
3.	*Clathrodrillia incisa* Carpenter	72
4.	*Chrysodomus tabulatus* Baird	227
5.	*Lora tabulata* Carpenter	101
6.	*Lora quadra* Dall	97
7.	*Trophon orpheus* Dall	For description, see Part II
8.	*Trophon beringi* Dall	For description, see Part II

PLATE 18

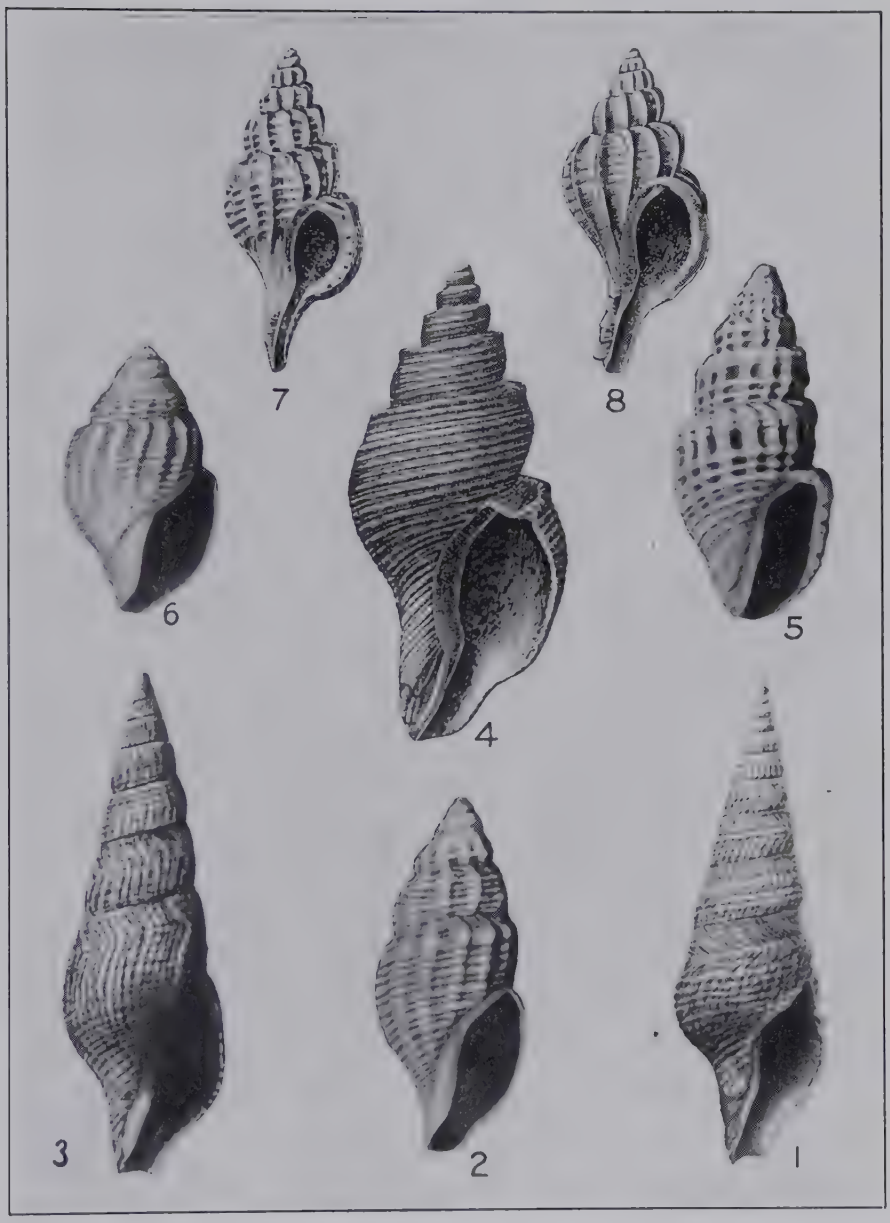


Plate 19

From *Proceedings of the United States National Museum*, except figure 2, which is from Canadian Arctic Expedition.

FIGURE		PAGE
1.	*Cryptogemma chrysothemis* Dall	80
2.	*Volutopsius stefanssoni* Dall	187
3.	*Buccinum kadiakense* Dall	248
4.	*Antiplanes litus* Dall	87
5.	*Cymatosyrinx halocydne* Dall	69
6.	*Borsonella omphale* Dall	90
7.	*Cytharella janira* Dall	148
8.	*Clathrodrillia fancherae* Dall	74

PLATE 19

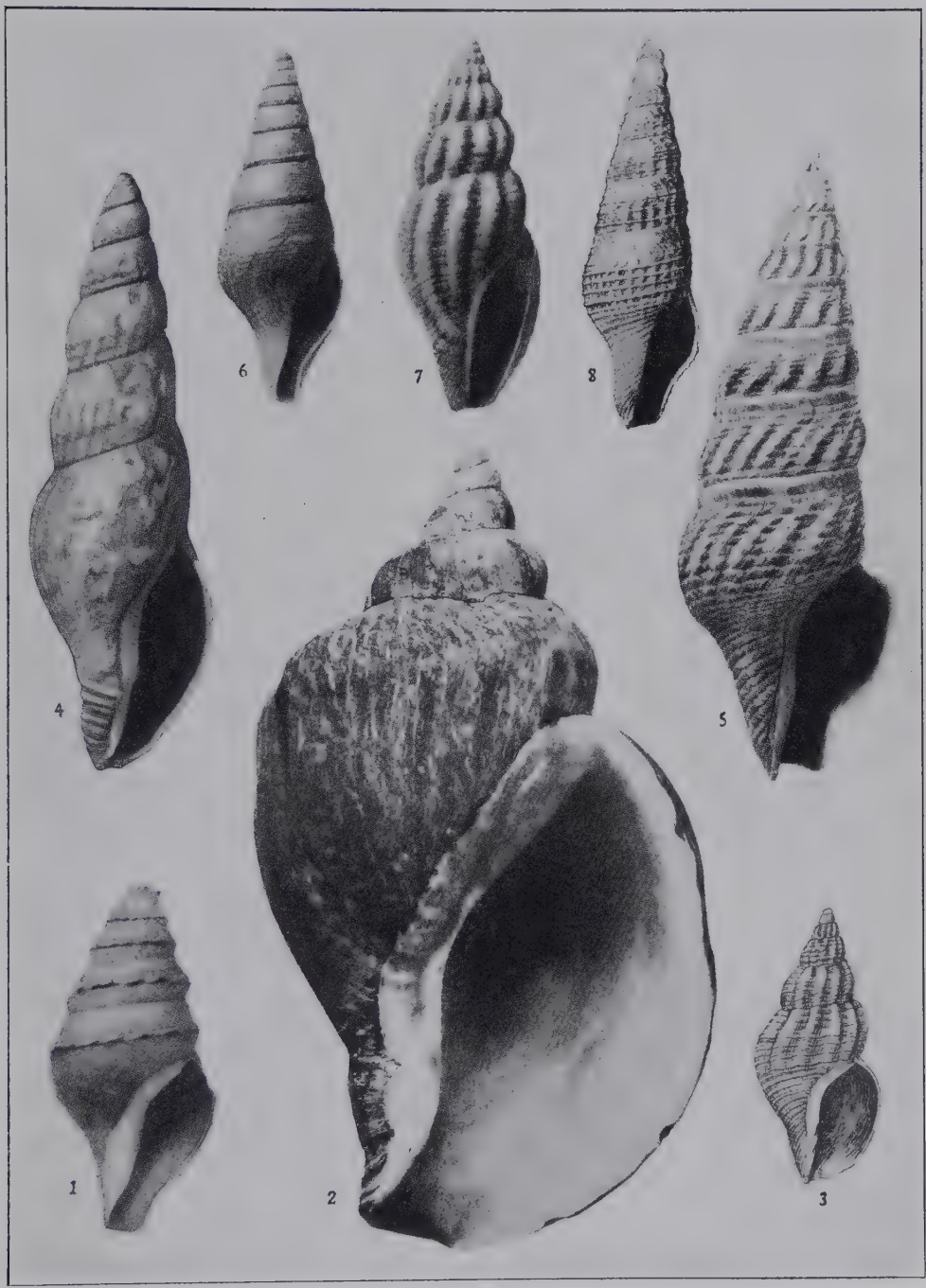


Plate 20

FIGURE PAGE

1. *Chrysodomus liratus* Martyn 237
2. *Chrysodomus* form *liratus* 237
3. *Chrysodomus* form *liratus* 237
4. *Chrysodomus liratus* Martyn 237
   Young

PLATE 20

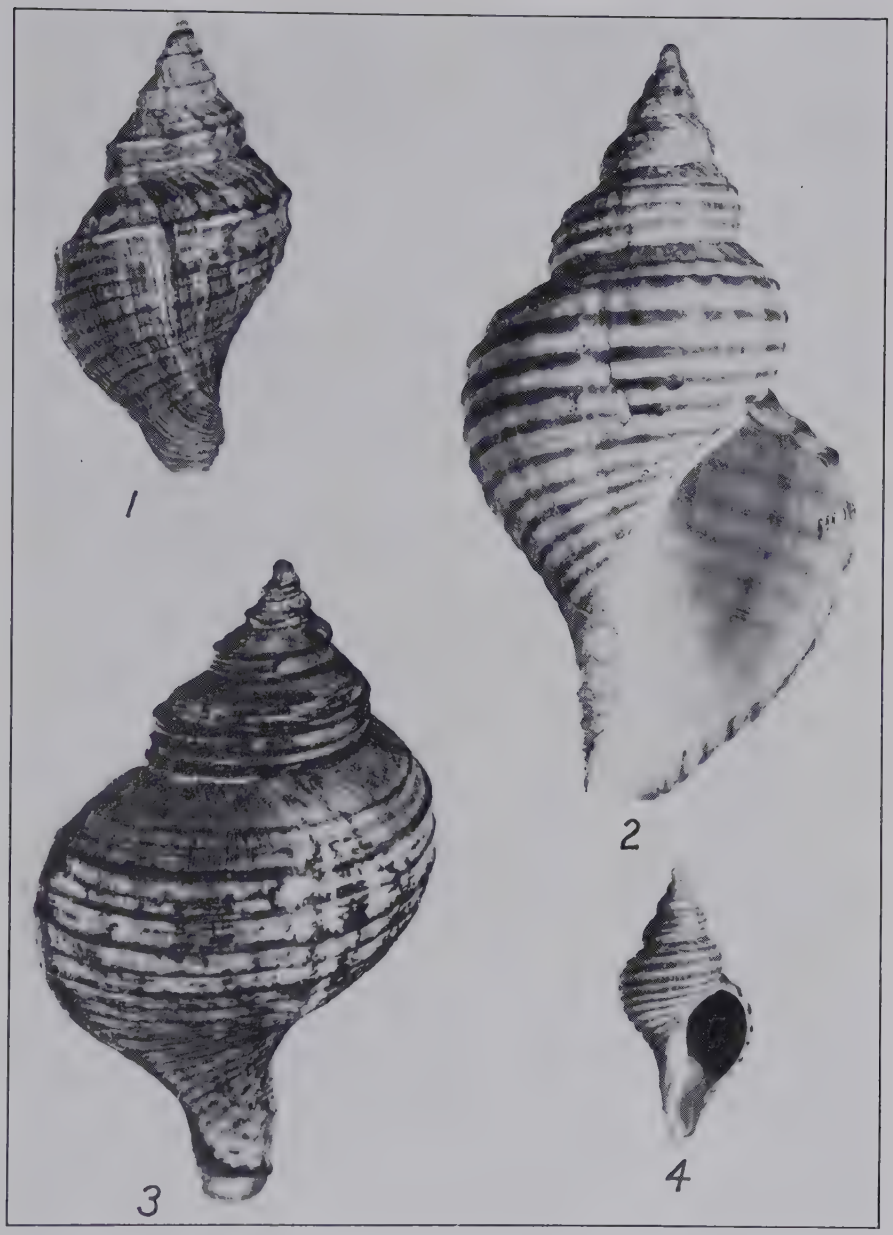


Plate 21

This plate from *Proceedings of the United States National Museum*, **66.**

FIGURE		PAGE
1.	*Ancistrolepis beringianus* Dall	204
2.	*Beringius stimpsoni* Gould	195
3.	*Beringius indentatus* Dall	197
4.	*Chrysodomus pribiloffensis* Dall	231

PLATE 21

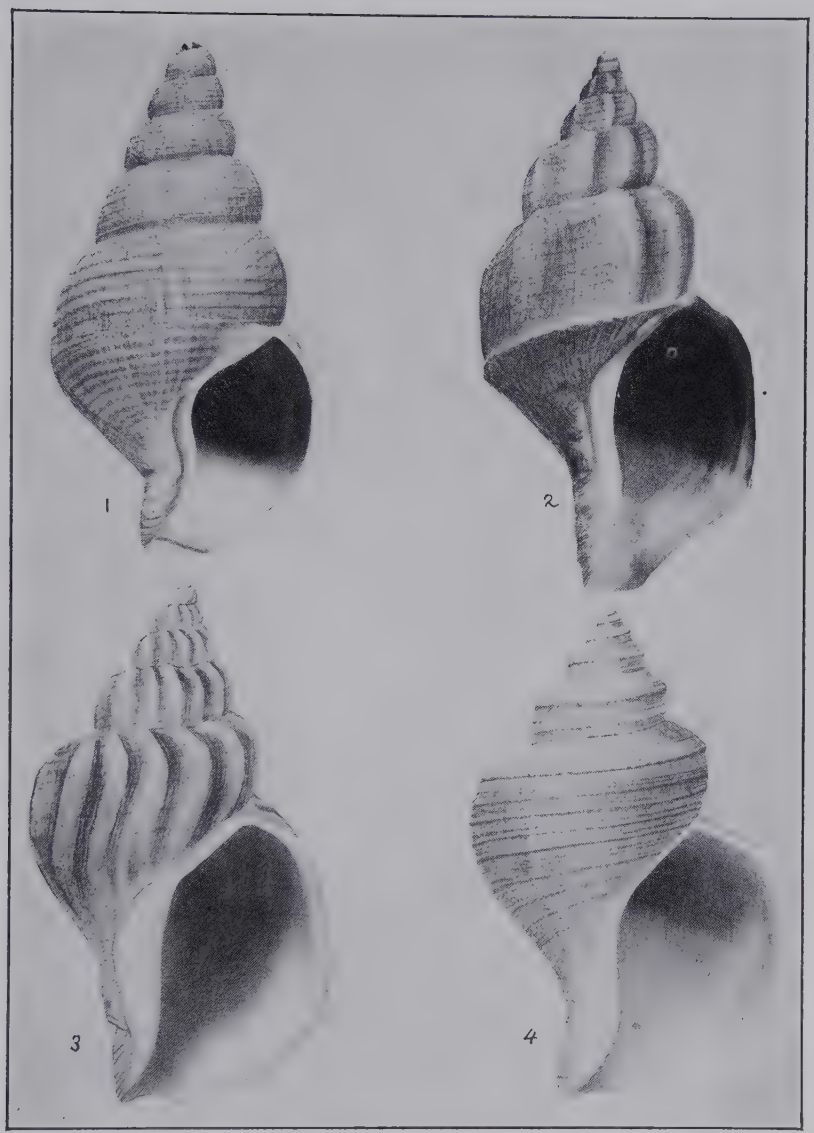


Plate 22

This plate from *Proceedings of the United States National Museum.*

FIGURE		PAGE
1.	*Buccinum tenue rhodium* Dall	241
2.	*Buccinum chartium* Dall	244
3.	*Chrysodomus vinosus* Dall	232
4.	*Volutopsius rotundus* Dall	188
5.	*Beringius malleatus* Dall	195

PLATE 22

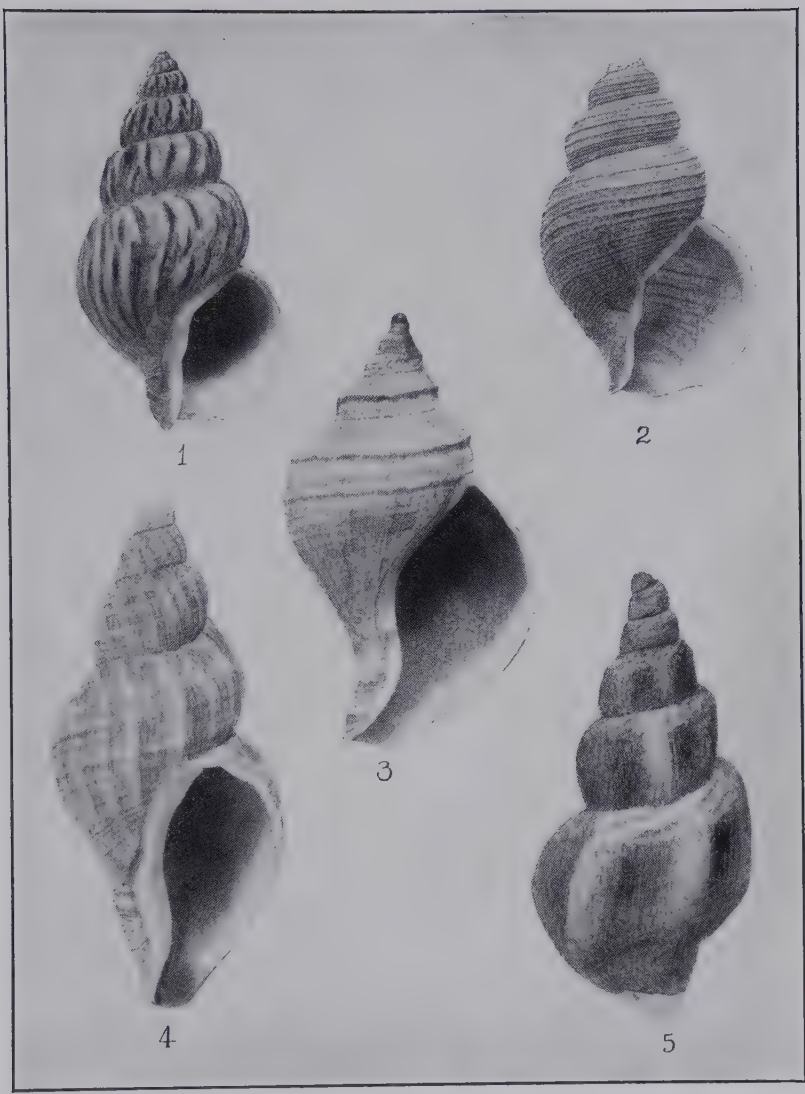
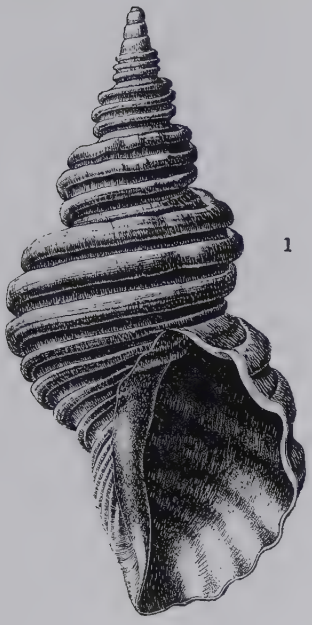


Plate 23

This plate is from *Proceedings of the United States National Museum.*

FIGURE		PAGE
1.	*Beringius crebricostatus* Dall	193
2.	*Volutopsius beringi kobelti* Dall	187
3.	*Beringius kennicottii* Dall	194
4.	*Fulgoraria stearnsii* Dall	167

PLATE 23



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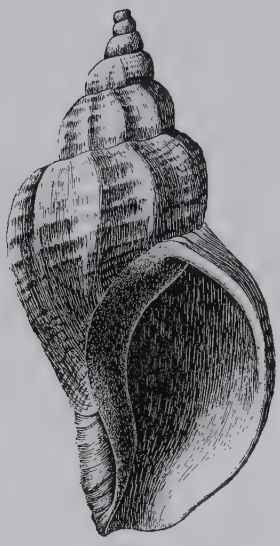

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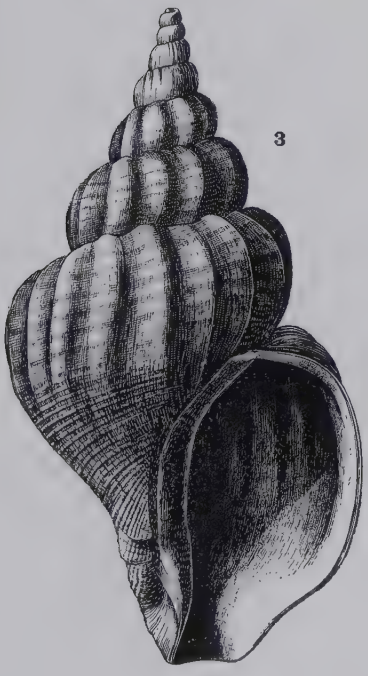

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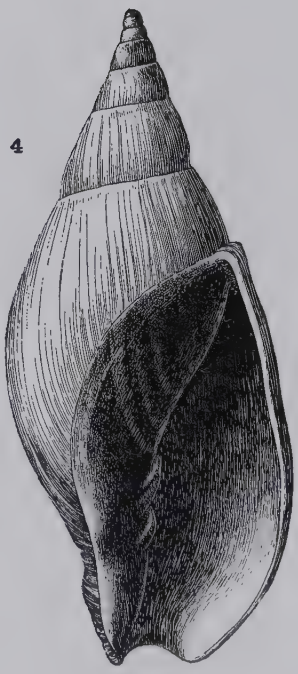

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Plate 24

This plate from *Proceedings of the United States National Museum.*

FIGURE		PAGE
1.	*Buccinum planeticum* Dall	246
2.	*Buccinum pemphigus* Dall	244
3.	*Buccinum castaneum fluctuatum* Dall	250
4.	*Colus nobilis* Dall	213

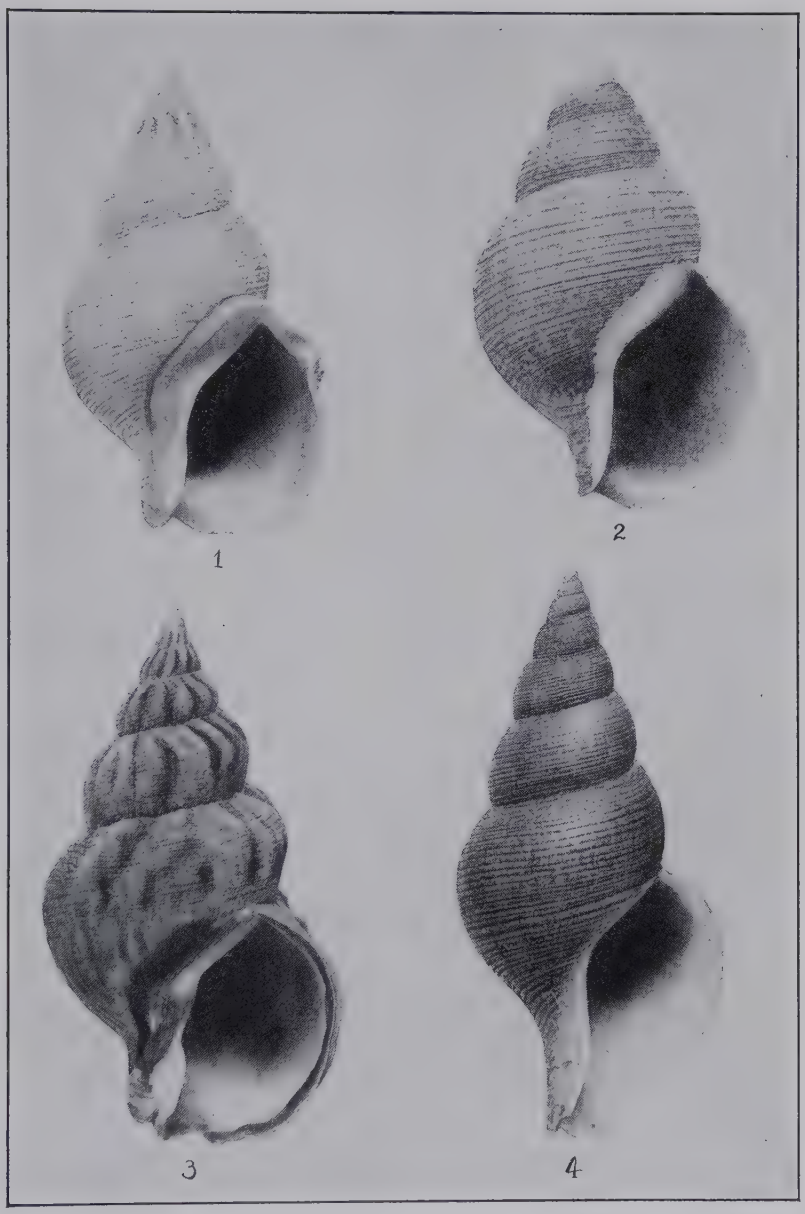
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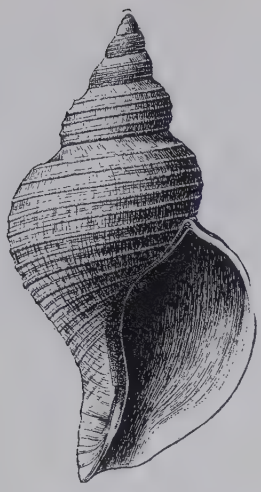
Plate 25

This plate from *Proceedings of the United States National Museum.*

FIGURE		PAGE
1.	*Chrysodomus phoeniceus* Dall	231
2.	*Beringius aleuticus* Dall	196
3.	*Chrysodomus insularis* Dall	228
4.	*Chrysodomus ithius* Dall	229
5.	*Ancistrolepis magnus* Dall	203
6.	*Buccinum taphrium* Dall	261
7.	*Ancistrolepis eucosmius* Dall	202
8.	*Mohnia frielei* Dall	200
	With the operculum magnified.	
9.	*Colus halibrectus* Dall	226

PLATE 25



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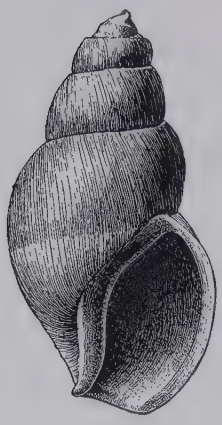

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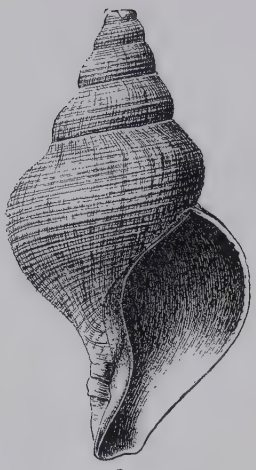

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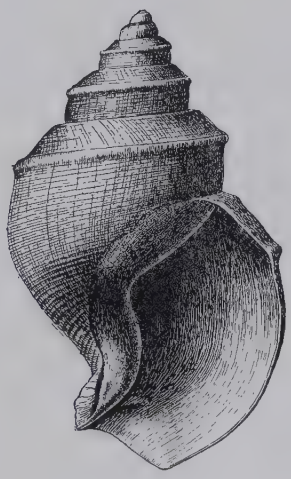

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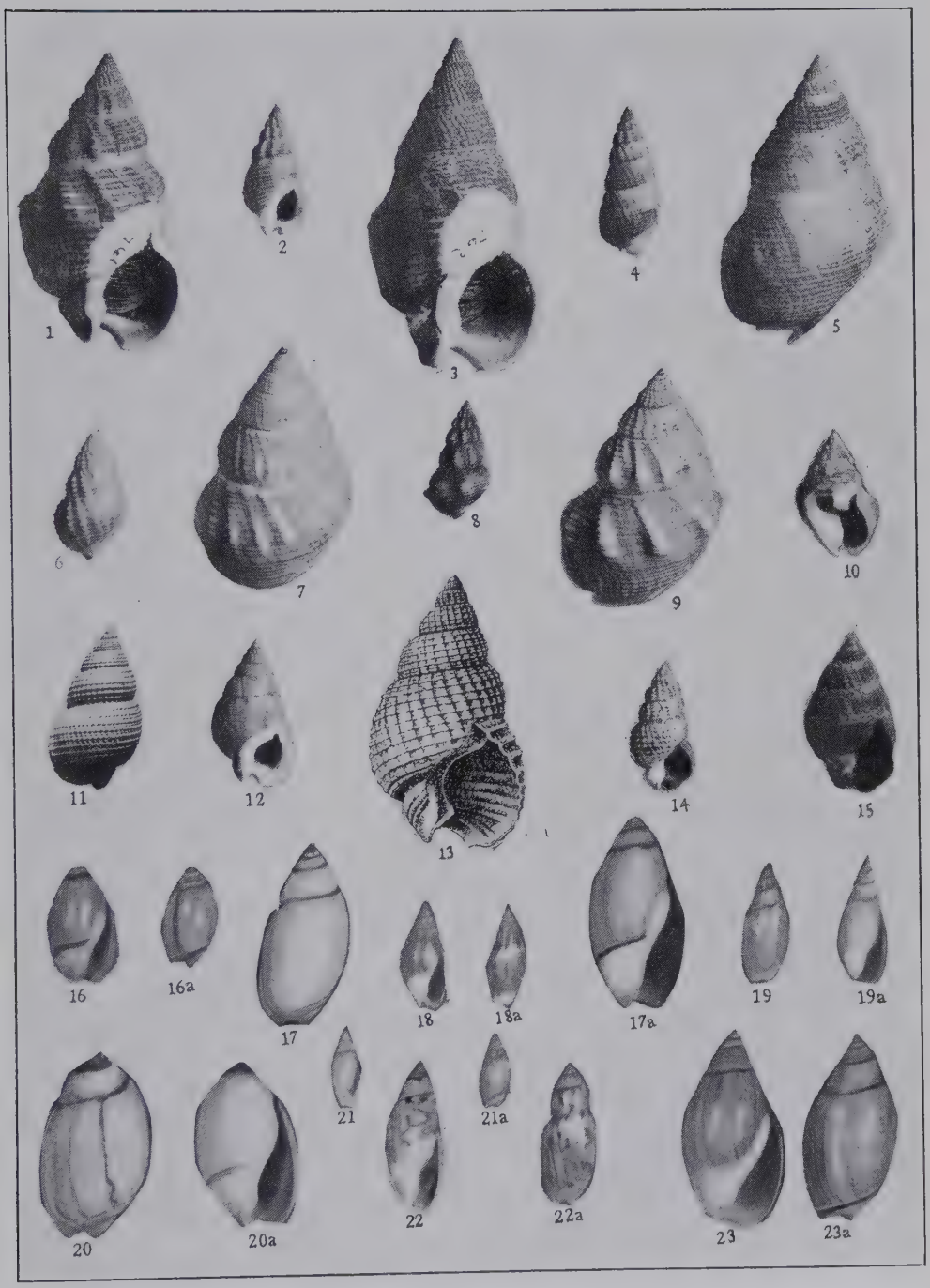
Plate 26

FIGURE		PAGE
1, 3, 5, 7, 9.	*Alectrion fossatus* Gould	264
2.	*Alectrion mendicus* Gould	Not in text
	Form.	
4.	*Alectrion mendicus indisputabilis,* n. subsp.	Not in text
6.	*Alectrion mendicus* Gould	265
8.	*Alectrion cooperi* Forbes	265
10.	*Alectrion tegulus* Reeve	267
11.	*Alectrion perpinguis* Hinds	266
12.	*Alectrion insculptus* Carpenter	267
13.	*Alectrion californianus* Conrad	264
14.	*Alectrion mendicus* Gould	265
	Form.	
15.	*Alectrion obsoletus* Say	269
16, 16*a*.	*Olivella biplicata parva* T. S. Oldroyd	162
17, 17*a*.	*Olivella biplicata angelina* T. S. Oldroyd	161
18, 18*a*.	*Olivella boetica diegensis* T. S. Oldroyd	163
19, 19*a*.	*Olivella boetica* Carpenter	163
20, 20*a*.	*Olivella biplicata* Sowerby	160
	Typical.	
21, 21*a*.	*Olivella boetica mexicana* T. S. Oldroyd	163
22, 22*a*.	*Olivella boetica* Carpenter, Alaska	163
23, 23*a*.	*Olivella biplicata fucana* T. S. Oldroyd	161

PLATE 26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23a

Plate 27

Nos. 1, 2 from the original figures from Martyn, *Figures of Nondescript Shells.* Nos. 3, 4 from the original figures by the American Museum of Natural History, New York.

FIGURE		PAGE
1.	*Chrysodomus saturus* Martyn	232
2.	*Chrysodomus saturus* Martin	232
3.	*Buccinum baeri mörchianum* Fischer	258
4.	*Buccinum baeri mörchianum* Fischer	258

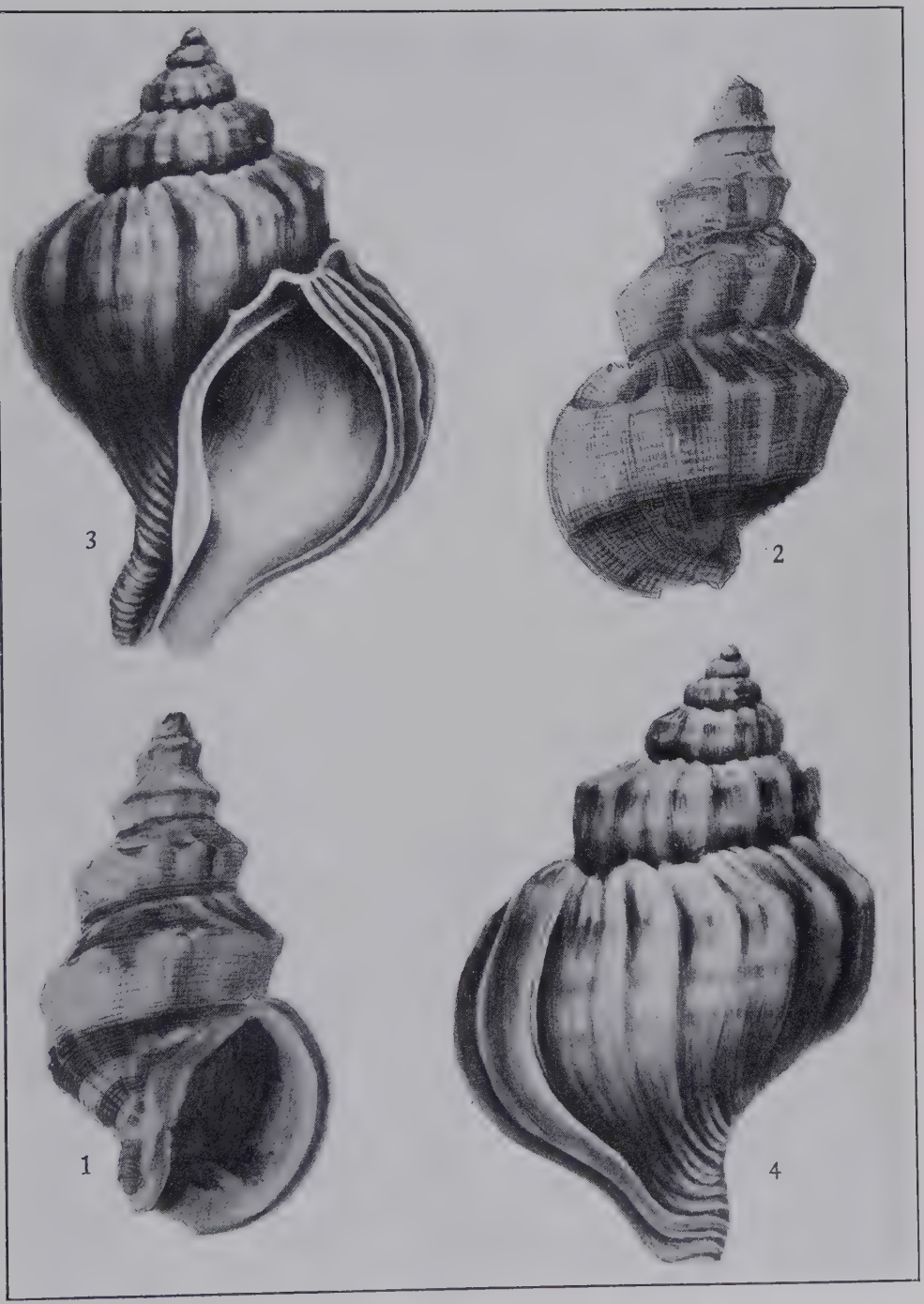
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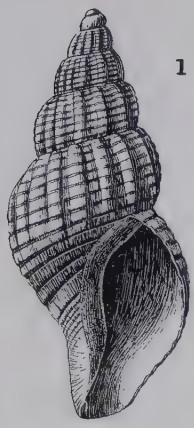
Plate 28

This plate from *Proceedings of the United States National Museum.*

FIGURE		PAGE
1.	*Plicifusus brunneus* Dall	210
2.	*Exilia rectirostris* Carpenter	206
3.	*Fusinus roperi* Dall	180
4.	*Antiplanes vinosa* Dall	82
5.	*Columbella aurantiaca* Dall	276
6.	*Colus martensi* Krause	222
7.	*Murex petri* Dall	For description, see Part II
8.	*Antiplanes perversa* Gabb	82
9.	*Murex carpenteri* Dall	For description, see Part II

PLATE 28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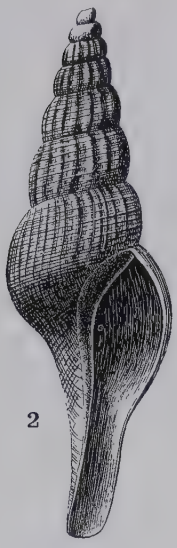
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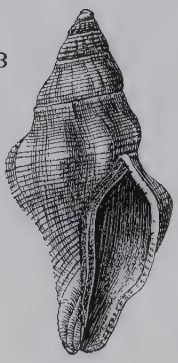
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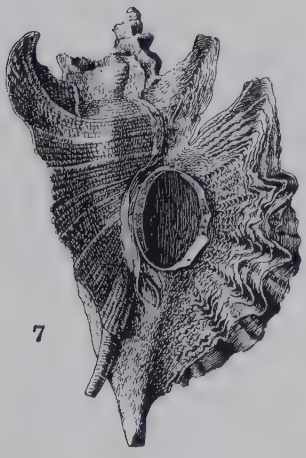
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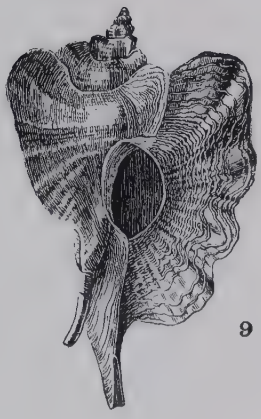
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Plate 29

This plate is from *Bulletin 112,* United States National Museum.

FIGURE PAGE

1. *Pyrulofusus harpa* Mörch 184

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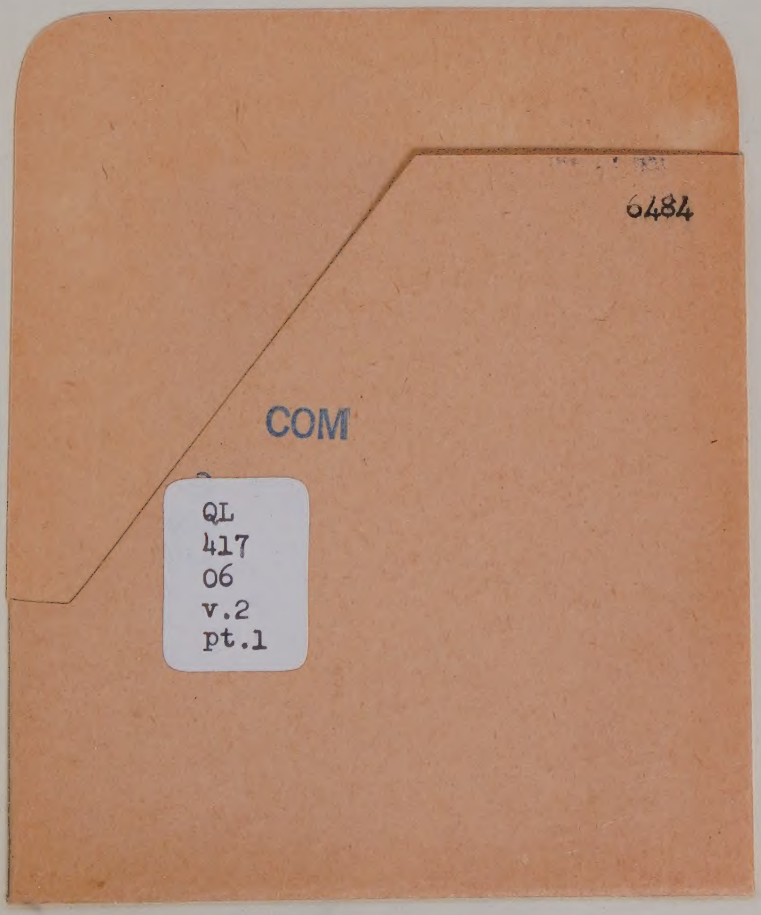
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